APR 29 1898

THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 28, 1898. CHICAGO, ILL. NUMBER 17

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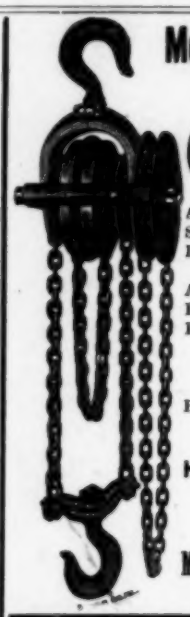

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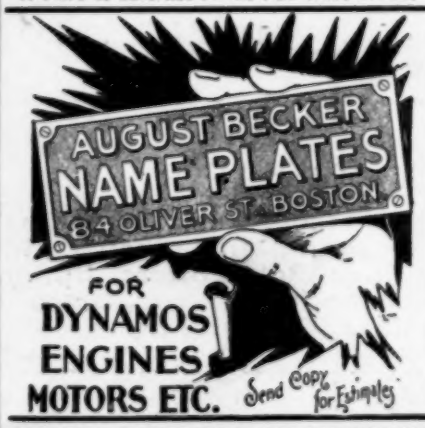

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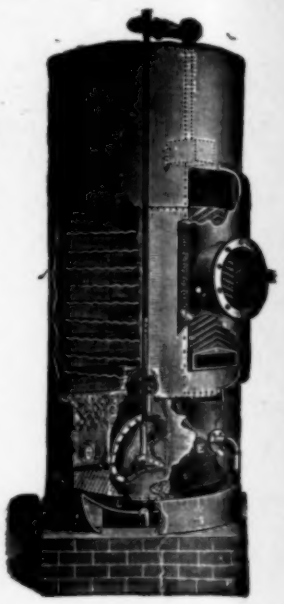

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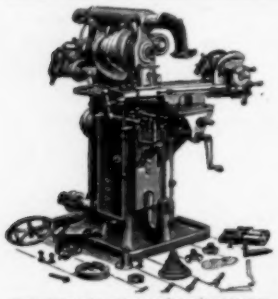

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THE IRON TRADE REVIEW

VOLUME XXXI. CLEVELAND, O. APRIL 28, 1898. CHICAGO, ILL. NUMBER 17

THE WEEK IN IRON CIRCLES.

THE MARKET AT LARGE.

The iron trade has not regarded the declaration of war as any reason for suspending operations. On the contrary some vigorous buying has gone on in the last week; not in conspicuously large orders, but in a steady filling of requirements that indicates confidence in the stability of business. It is realized that if buyers and sellers act on their knowledge of the inherent strength of the situation rather than the disposition toward pessimism that often shows itself in times of agitation, there will be no serious disturbance of industry. Material is being taken on contracts at a surprising rate, and in many cases new purchases have had to be made much sooner than was anticipated. So far as volume of current operations is concerned, the situation has marked prosperity features. There may be this characteristic of the business in iron and steel for the next month or two, as distingushed from the market in the past six months: Purchases may not reach so far into the future. The fact that requirements for a considerable portion of the year have been covered in so many lines will help to give stability to the market, and as short-time purchases are added from week to week, even in the way that has been seen in the past two months of uncertainty, it can be appreciated that in spite of several months of hostilities 1898 might prove a record-making year. With our foreign commerce almost entirely with neutral nations, which will not tolerate interruption to their ocean trade from either of the combatants, serious curtailment of exports need not be anticipated. As for home consumption there is no present apprehension that it will be greatly abridged, while millions of expenditures on war account will be added monthly. Pittsburg, which more than any other center gauges the situation in finished material, gives encouraging reports for the past week. War requirements have been an insignificant element there, but demand from all sources is so large as to suggest that the certainty of war is a momentary stimulus. In a few lines prices are held more firmly and in plates an advance of from $1 to $2 a ton has been made. Bridge, ship-building, steel car and boiler work have all contributed to filling up the plate mills. And while some proposed work is known to be held back, the aggregate of structural business in the week is considerably beyond expectations. Southern iron has had the largest week's sales for the month, with some irregularity in price due to the occasional marketing of warrant iron. The large interests appear to be holding prices. The meeting of producers of foundry and forge irons at New York continued through Friday and Saturday of last week and developed a very general expression in favor of a permanent organization, through which the problem of preventing or of handling surplus stocks should be worked out. A committee to formulate a plan spent the greater part of Monday in devising a scheme of organization, which will be submitted for ratification. It is quite certain that an association will result and that 95 per cent of the producers of non-Bessemer iron will be included. The Bessemer furnaces of the two valleys, as a result of a Cleveland meeting, April 25, will continue the present arrangement for the time being, and the price remains at $10 valley furnace. Further action will depend on the developments of the coming month. There is no plan for any concert of action in closing down furnaces. If there is any further banking or blowing out it will come through individual initiative. Present stocks of iron are not burdensome, when the rate of consumption is considered; the chief complaint is that at the present coke price and the new basis for ore there is no living on less than $10 iron. The war has cut off Cuban supplies of ore and Lake Superior shipments east will probably be increased several hundred thousand tons.

PITTSBURG.

OFFICE OF *The Iron Trade Review and Industrial World.*
508 TRADESMEN'S BUILDING, April 27.

A decided move in buying has come during the week. It is attributed by the mills to a settled Cuban policy. Plates have advanced $2 a ton and cannot be had for early delivery. Sheets, bars and pipes have all been affected and further price changes are not unlikely. A peculiarity of the new business is the general clamor for immediate shipment. Pig iron has done nothing, pending the outcome of this week's Cleveland meeting of furnacemen.

PIG IRON.—There has been no break so far in the ranks of the valley furnacemen and transactions in Bessemer iron have narrowed down almost to the point of total inactivity awaiting the result of pending conferences of the furnace companies. The iron to be had below $10 valley, from second hands, is small in quantity and only a few odd lots have been offered by Pittsburg selling interests at the $9.65 and $9.75 basis named ten days ago. Foundry and gray forge are inactive. Quotations in Pittsuburg are as follows:

Bessemer, valley	$ 9.75 to	10.00
Bessemer, Pittsburg	10.40 to	10.65
No. 1 Foundry	10.40 to	10.50
No. 2 Foundry	9.90 to	10.00
No. 3 Foundry	9.50 to	9.75
Gray Forge, valley	8.75 to	8.85
Gray Forge, Pittsburg		9.25

STEEL.—A scarcity is reported in tin and sheet bars for May and June delivery. Some mills are already behind time in deiliveries and inquiries for immediate shipments have been frequent during the week. Billets continue to be quoted at $15 valley and Wheeling and $15.25, and a shade less, Pittsburg maker's mill, with sheet bars holding at $17, valley and Wheeling, and $17.25, Pittsburg, maker's mill. Rods are till weak, $21 being quoted.

SHEETS.—Neither the largely increased inquiry for black sheets the shortage in sheet bars, nor the present prospect of a shortage in gauges in June and July has so far stiffened prices. Very low sales are still rumored but no mill is quoting less than 1.95c for new business in No. 28. Mills re firm in declining long deliveries. Galvanized sheets are quoted at 80 and 7½ per cent off list.

FERRO-MANGANESE.—The supply of ferro-manganese is short and the local producer is having no difficulty in getting $49.50 and $50 on new business in 80 per cent ferro. The market is not expected to ease for a month yet.

PLATES.—The Pittsburg mills have advanced sheared plates to 1.10c without concerted action, owing to the heavy demand for prompt plates. War orders are not alone responsible, as little of this has so far reached Pittsburg. Ship plates and steel car orders have the mills filled for two months and the business of the week from all quarters has been unusually heavy, being, as a rule, for immediate needs. Mills quote: Tank, Bessemer, and open-hearth, 1.10c; shell, 1.20c; flange, 1.30c; fire box, 2c and upwards.

RAILS AND TRACK MATERIAL.—Rails are quiet at $18, Pittsburg, and track material is quoted as follows: Iron track

bolts, 1.65c to 1.70c; steel spikes, 1.45c to 1.55c; splice bars, 1.10c to 1.15c; links and pins, 1.20c.

STRUCTURAL MATERIAL.—New business has increased noticeably since a definite step concerning Cuba has been taken. Much of the work was evidently postponed buying, as orders during the week have been largely for the earliest delivery possible. The result is a stiffening that may bring higher prices before long. Pool quotations are made as follows: Beams and channels, 3 to 15 inches, 1.15c; 18 to 24 inches, 1.25c; tees, 1.20c; zees, 1.15c, and angles, 1.05c. Universal plates in connection with shapes are selling at 1c; alone, at 1.10c. Large contracts are lacking and noticeably so in such a heavy tonnage as was closed in the week. The Harrisburg Capitol order of 3,000 tons has not been placed as yet.

BARS.—Two local mills are still weak on steel bars and on attractive orders are shading 95c. Other mills have taken some of the agricultural business offered in the last ten days and are holding to 1c. Valley mills, owing to car and agricultural specifications, are sold up on bar iron and are asking a firm 95c. Car specifications continue heavy.

SPELTER.—Prime Western spelter is steady and is quoted at $4.20 and $4.22½.

PIPES AND TUBES.—The sudden jump in buying has been felt as much in pipe as elsewhere, and is similar to the buying in other branches also, in that the total is an accumulation of small orders placed with requests for urgent deliveries. Several mills are full on certain sizes. The mills are reported to be maintaining the provisional six tens and five per cent which is effective till the manufacturers' meeting here next week. The base discounts are :Butt weld, black, 57 per cent off; lap weld, black, 67 per cent off; butt weld, galvanized, 50 per cent off; lap weld, galvanized, 55 per cent off. Discounts on merchant boiler tubes are as follows: 2¼ inch and smaller, 72½ per cent off; 2½ inch and larger, 75 per cent off.

IRON AND STEEL SKELP.—Steel skelp is slightly higher. We quote: Grooved steel skelp, 1c to 1.05c; sheared steel skelp, 1.05c to 1.07½c; grooved iron skelp, 1.05c to 1.10c; sheared iron skelp, 1.12½c to 1.15c. All four months, f. o. b. buyers' mills, or 2 per cent off for cash.

SPIEGEL.—There is an advance in quotations on spiegel. Domestic, 20 per cent is quoted at $23.50 and $24.

OLD MATERIAL.—The week's sales include 500 tons of iron rails at $13.75; 500 tons of steel rails at $10.50; 500 tons bushveling scrap, $9.50, net; 400 tons No. 1 wrought, $11.50, net; 400 tons machine scrap, $9, gross, and 400 tons No. 1 cast, $9.50, gross. Other quotations are: Car wheels, Pittsburg, $10.25, gross; heavy melting stock, $10.75, gross; cast borings, $5.75; billet and bloom ends, run of mill, $11; wrought turnings, $7.50, gross.

CLEVELAND.

OFFICE OF *The Iron Trade Review and Industrial World.* }
27 VINCENT ST., April 27. }

While some cargoes of 1898 ore have been unloaded at Lake Erie docks the amount brought down in April is not what the vessel interest counted on some time ago. Furnaces were not prepared to take the ore in some instances and it was not desirable to put it on dock. The total on docks April 1 was about 3,700,000 tons. The movement this month from docks to furnaces has been large, and the expectation is that the statement of dock stocks May 1 will show practically the same amount as on May 1, 1897. Sales of ore continue from week to week, but the status of independent Mesabi ores is still undetermined. Prices have been quoted on them but furnacemen are not taking hold even under guarantees of any price that may be established later. It is evident from the plans for mining operations at old range Bessemer properties, that on the Gogebic range in particular the days of largest production have been seen at a number of mines. A few will make large outputs, but in other cases 1898 will further emphasize the drain that has been going on for the past decade. It cannot be gainsaid that the rate of Bessemer ore consumption in the past few years has made more of an impression on Lake Superior reserves than many have appreciated. There is no encouragement, moreover, in the present level of prices to any large outlay in exploratory work that shall bring to light supplies not now in sight. It would appear that the Mesabi must cut more of a figure with each succeeding year if the enormous rate of Bessemer steel production in 1897 is to keep up in the next few years. Indications are that Lake Superior ores will increase their Eastern trade by several hundred thousand tons this year. The Cuban ore mines, which have been under Spanish protection, have now ceased shipping and the embargo may last for months.

PIG IRON.—The Bessemer iron producers of the two valleys had a meeting in Cleveland Monday, the outcome of which was a decision to continue for the present the tentative arrangement that has been maintained throughout April. No definite steps toward incorporation have been taken, but provision is made for a stronger guaranty that any plans which may be finally determined upon shall be made effective. Since the first meeting was held there has been a reduction of Bessemer stocks, and iron that has been under control of buying and selling interests is less in evidence. Some recent sales of this latter have been made at $9.60 at furnace, but no transactions on the $10 basis at furnace. Current consumption of Bessemer metal by certain steel works is still in excess of their own production, however. With the end of the week Carrie Furnace passes into the hands of the Carnegie Steel Co., Ltd., and Pittsburg purchases of Bessemer iron will be more completely on the basis of the valley price plus freight than in many months. Foundry iron has been steadily shipped under contract and sales have kept up in moderate volume, with no large single transactions. The valley furnace quotation remains at $9.50. Forge iron is firm at $8.75 at furnace, or $9 at valley mill. We quote Cleveland deliveries:

Bessemer, second quarter	$10 65	Valley Scotch No. 1	$10 65@10 75
No. 1 Strong Foundry	10 65	Valley Scotch No. 2	10 25@10 40
No. 2 Strong Foundry	10 15	Gray Forge	9 40
No. 3 Foundry	9 65	Lake Superior Charcoal	11 50

BILLETS.—Recent quotations are about $15.50 delivered, though buying and selling interests have been willing to shade delivered prices of mills. There has been no large buying since the establishment of the American Steel & Wire Co. to indicate the plans of that company as to its steel supply. Under present conditions of the leading Chicago interest water shipments will probably not be made to Cleveland, since the present movement in billets is rather from the Central West to the Chicago district. It is to be presumed that the Cleveland mills will be supplied, in part at least, with Cleveland district steel, as heretofore. We quote sheet and tin plate bars at $17.50, with Pittsburg mills naming a higher delivered figure.

FINISHED MATERIAL.—There has been a good aggregate of mail orders in the past week and no slackening is attributable to the declaration of war. Lima oil field operations seem to be on a better scale than in a year and boiler work there has called for considerable material. Plates are quoted $2 a ton higher for sheared, making the present basis 1.10c, Pittsburg. Steel bars are held a trifle higher by some mills, at 1.05c, Cleveland. Valley bar iron mills are beginning to make calculations for the termination of the scale year, and operations will be at a good pace in the next two months. The outcome of a scale conference with a new leader at the head of the Amalgamated Association is yet to be developed. We quote bar iron 1c, Cleveland; No. 27 black sheets, 2c to 2.05c; beams and channels, 1.23½c; universal plates, 1.25c. Prices on wire and wire nails are quoted $1.10 and $1.30 respectively. Old material is unchanged, at $13.50 for old iron rails; $10 to $10.50 for old steel rails; $8.50 for cast scrap; $11.00 for No. 1 railroad wrought scrap, and $11 for old car wheels.

CHICAGO.

OFFICE OF *The Iron Trade Review and Industrial World.* }
1142 MONADNOCK BLOCK, April 27. }

In nearly all branches of the market, the week was quiet and uneventful, and sales were not especially large. In pig iron considerable business was done, the larger part of it to malleable interests. Consumers of pig iron appear to have the idea that the present is the best time to buy, as in addition to the large orders placed within the past three weeks a large tonnage will probably be placed soon by some of the heavy buyers who have not yet filled their requirements for the balance of the year. Not much business is going in steel. Consumers have been affected by the Spanish war to some extent, and have apparently postponed buying until it is more definitely known what the effect will be upon the market.

PIG IRON.—Milwaukee and Racine malleable foundries bought the larger part of the iron sold last week, placing orders for about 20,000 tons of malleable Bessemer and charcoal iron. All of this was given to Northern furnaces. Aside from these orders the Northern interests secured only a comparatively small amount of business. Southern furnaces closed up in the neighborhood of 5,000 tons, all of it in lots of 1,000 tons and smaller. The unfilled inquiries in hand are still large, and it is expected that buying will continue to be heavy for several weeks more. The large agricultural implement manufacturers have not yet bought their supply of iron for the ensuing year, and are expected to place their orders rather earlier than usual this year. In fact, one or two of the largest ones have already asked for prices, although they may not buy for a few weeks. The foundries in this district continue to keep busy, and there is every reason to believe their business will continue to be good for an indifinite time. The market is undoubtedly a strong one, and while reasons can be advanced for higher prices, or at least no lower ones, the local situation seems to furnish no arguments to the contrary. The local furnaces are all full of orders for the next six months, at least, without selling another pound of iron. The Southern furnaces represented here are fairly well sold up, and those in the combination are maintaining schedule prices, while those outside are more nearly on the combination schedule every week, as their order books become filled. One of the outside interests has withdrawn its prices from this market, because of the well filled condition of its order book. What effect the war will have upon the market is of course problematical. Judging from the way sales have been made lately, the majority of the buyers do not look for lower prices, in any event. The sellers do not, as a rule, venture prophesies, but most of them incline to the opinion that the war will eventually cause higher prices and a larger consumption of iron, even if both prices and consumption recede in the meanwhile, which they are not ready to admit will be the case.

Lake Sup. Charcoal	$11 50@$1 200	South'n Coke No. 3	$10 10@10 35
Local Coke Fdy. No. 1	11 50@12 00	Southern No. 1 Soft	10 60@10 85
Local Coke Fdy. No. 2	11 00@11 50	Southern No. 2 Soft	10 35@10 60
Local Coke Fdy. No. 3	10 75@11 00	South'n Silveries	11 25@11 50
Local Scotch Fdy. No. 1	11 50@12 00	Jackson Co. Silveries	12 50@14 50
Local Scotch Fdy. No. 2	11 00@11 50	Ohio Strong Softeners	12 00@12 25
Local Scotch Fdy. No. 3	10 75@11 00	Alabama Car Wheel	14 00@16 00
South'n Coke No. 1	10 60@10 85	Malleable Bessemer	11 50@12 00
South'n Coke No. 2	10 35@10 60	Coke Bessemer	11 50@12 00

BARS.—The mills in this territory have been doing a very satisfactory business, although no large single orders were closed up last week. There have been a few inquiries for large lots, for future delivery, but the mills are not anxious to make sales long into the future at present prices, and so far have not done so to any extent. The market is unchanged, but prices are fully as firm as they were a week ago, if not firmer. Common iron is quoted at 1.05c to 1.10c; guaranteed, 1.10c to 1.15c; soft steel bars, 1.15c to 1.20c.

CAR ORDERS.—No large contracts were placed last week, but several for small lots of cars were closed up, making a good aggregate for the week. The sales of car materials of all kinds continue good.

RAILS AND TRACK SUPPLIES.—Light sections have been in fair demand and some business has been done in them. Very few sales of heavy sections have been made, and these are only small. Quotations are as follows: Rails, $20 to $22.50, according to specifications; steel splice bars, 1.15c to 1.25c; track bolts, with square nuts, 1.80c to 1.90c; hexagon nuts 1.90c to 2c; spikes, 1.50c to 1.60c.

BILLETS AND RODS.—Further sales have been made in this market by mills farther East, at about the prices prevailing for the past week. No sales of either billets or rods have been made by the local mills. Billets are still quoted at $16.50 to $17, and rods at $23.25 to $23.75.

STRUCTURAL MATERIAL.—The C., B. & Q. Road is in the market for about 3,000 tons of material for track elevation. It is not expected that the work will be done this season, but the material will be bought and made, all ready to put up another year. About 1,000 tons of shapes for a Government building at Portland, Ore., were contracted for last week, the job being taken by a Milwaukee contractor. Other business was limited to comparatively small lots, but of these there was a good number, bringing the week's business up to a good total. Prices on plates have been advanced by some of the mills, and others are expected to follow soon. Quotations are made as follows: Beams, 15-inch and under, 1.30c to 1.35c; 18, 20 and 24-inch, 1.40c to 1.45c; angles, 1.20c to 1.25c; plates, 1.15c to 1.20c; tees, 1.35c to 1.40c. Small lots from stock are quoted at one-quarter to one-half cent higher.

PLATES.—Considerable orders were closed for plates of various kinds last week, most of them for small lots, but the aggregate was quite large. The demand appears to keep up well, both for mill and store business. Prices are firmer, and are made as follows: Tank steel, 1.15c to 1.20c; flange steel, 1.20c to 1.40c; fire box steel, 1.85c to 5c.

MERCHANT STEEL.—The local dealers report a good week's business closed, and good inquiries for future business. The market appears to be quite active, though most of the trades are individually small. Prices follow: Open-hearth spring, tire and machinery steel, 1.60c to 1.70c; smooth finished machinery steel, 1.60c to 1.65c; smooth finished tire, 1.50c to 1.60c; tool steel, 5.50c to 7.50c; specials, 11c and upwards

SHEETS.—A few good contracts were placed last week, but the bulk of the business closed was in small lots. The demand is good, and sales are expected to be fair in the near future. Quotations are made at 2c to 2.10c for No. 27, black, and 80 and 10 per cent discount for galvanized.

SCRAP.—The market has been quiet, with comparatively small sales. The demand is small and not much business is looked for in the next two or three weeks. Dealer's selling prices are as follows:

Old iron rails, gross	$12 00@$12 25	Axles, net	$14 25@$14 75
Old steel rails, long, gr.	10 50@ 11 00	Cast borings, net	4 00@ 4 25
Old steel rails, short	9 00@ 9 25	Wrought turnings, net	5 50@ 6 00
Old wheels, gross	11 00@ 11 50	Axle turnings, net	6 25@ 6 75
Railroad forge, net	12 00@ 12 50	Mixed steel, gross	7 25@ 7 50
Dealer's forge, net	10 50@ 11 00	Stove plates, net	6 00@ 6 25
No. 1 mill, net	7 50@ 8 00	Heavy melting steel gr.	8 25@ 8 50
Heavy cast, net	8 50@ 9 00	Old iron splice b., net.	13 25@ 13 50
Malleable cast, net	8 00@ 8 50		

PHILADELPHIA.

April 26.

There has been more business in pig iron the past week than was to be expected with actual hostilities begun four days ago. Sellers of Southern brands in this territory have had a particularly good business. Prices are unchanged at the weakest figures for the year. No. 2X has sold at $10.75 and a shade less, and at near-by points, where Virginia and Eastern Pennsylvania irons compete sharply, this price is lessened by freight rebates. No. 2 plain has sold at $10.25, Philadelphia. Sales in general are made at inside figures. Standard mill irons are sold at $10 to $10.25 and ordinary mill iron at $9.75. Steel billets are inactive, but $17, delivered, is the basis of going business. Finished material holds up the good record of the past two months in plates. Shape mills also have taken good orders recently. In addition to the two steamships which are to be built at Chester, there has been a good run of orders from bridge and boiler works, so that a stiffening of plate prices has taken place, some mills already quoting higher prices, now that the fear of Western competition is removed. Pittsburg mills being reported very firm and unable to make early deliveries. Bar iron is the weakest feature in the finished list. We quote best refined bars at 1 10c, common bars at 1.05c: soft steel bars, 1.10c to 1.15c; plates, 1.15c to 1.25c; angles, 1.20c; beams and channels, up to 15 inches, 1.30c.

CINCINNATI.

April 26.

The iron trade seems to be little influenced by the tragic events impending; indeed the opinion obtains on every hand that so far as business is concerned, no serious interruption will be realized. Prices have been somewhat flexible on some outside lots and warrant irons, but the tonnage of the week has, in general, been so large that the market has toned up. The market is certainly being stimulated by some cause or other. Whether it is the war that is doing this or whether it is the customary spring buying movement is hard to determine, but that there is a larger inquiry and that the volume of sales is steadily increasing are facts that cannot be doubted. Prices of leading grades have remained practically the same since the middle of February. It is probable that April is going to prove to be a much better month than any of the Southern iron masters anticipated when it opened. We quote f. o. b. Cincinnati: Southern coke, No. 1 foundry, $9.75; No. 2, $9.50; No. 3, $9.25; gray forge, $8.75; mottled, $8.75; No. 1 soft, $9 75 to $10; No. 2, $9 50 to $9.75; Belfont coke, No. 1, Lake Superior, $11 to $11.50; Belfont coke, No. 2, Lake Superior, $10.50 to $10.75; Hanging Rock charcoal, No. 1, $14.50 to $15.50; Tennessee charcoal, No. 1, $12.50 to $13; Jackson Co. silvery, No. 1, $12.50 to $13; Standard Georgia car wheel, $14.25 to $15.

THE IRON TRADE REVIEW

AND

INDUSTRIAL WORLD.

DEVOTED TO MACHINERY, METAL-WORKING AND FOUNDRY TRADES AND IRON AND STEEL MANUFACTURE.

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ENTERED AT THE POST OFFICE AT CLEVELAND, O., AS SECOND CLASS MATTER

APRIL 28, 1898.

COMING UP OUT OF THE RANKS.

In his address on retiring from the presidency of the Chamber of Commerce, of Cleveland, last week, W. R. Warner, of the well known machine tool firm of Warner & Swasey, touched on a question in industrial sociology that is always discussed with interest. Beginning with the proposition that in this country the workman of to-day may be the employer of to-morrow, Mr. Warner affirmed that a working capital composed of tact and energy and earnestness and a fixity of pupose is sufficient to raise the young man to a position of honor and trust and confidence. In refuting the oft-repeated assertion of the preachers of discontent, that the workingmen of to-day are slaves, Mr. Warner asserted that the membership of the Chamber of Commerce itself gives abundant evidence of the possibility of rising from humble positions in the ranks of the employed. The few examples he cited in the following could be duplicated, and not less strikingly we are sure, in any similar body in the country:

I think of one, still only in middle life, who was a newsboy on the streets, and who is now a prominent official in one of the largest manufacturing enterprises in the city, and has from the outset rendered valuable service on our most important committees. I recall another whose indomitable spirit demanded educational opportunities procurable to him only through the performance of very menial services. He is frank to tell his own story, though to-day he is president of the richest banking concern in Cleveland and one of our most efficient members. Yet another there is, who, starting from the farm, became an eminent scientist, as well as millionaire inventor. A New England farmer's boy, apprentice in a machine shop, then journeyman, foreman, and finally proprietor, and manufacturer of national repute, a member whose presence was demanded on the most important committee formed here this year. The earnest enthusiasm of an errand boy in a grocery store atrracted the attention of a customer, who found him a better place, and he continued to advance, until he is now general manager of one of our large iron industries and a director in this chamber. A poor country boy of Scotch-Irish descent came here without a friend, without a trade, and without a possession other than a coarse suit of clothes that he wore. He applied for and secured a position in a dry goods store on Superior street at a small salary and sent home to his mother one-quarter of it the first year. Meanwhile, his younger brother was learning the harness maker's trade. In time he too came to Cleveland and practiced his trade until employment was found him in the same store with his brother. With brawn and brain and industry and integrity, they quickly made their way to that prominence which they now so abundantly enjoy in business, in society, and in municipal affairs. Both have served you well as directors of this chamber and both are tireless in working for the good of Cleveland.

We fully agree with Mr. Warner in deriving from the above narrative the generalization that "precisely the same creditable means whereby the rich may grow richer will also enable the poor to grow richer, the workingman to become the proprietor, the employed the employer." And yet we must never lose sight of the fact that times have changed, and that there are not the same paths opening up before the young men of to-day as opened up 30 years ago before those who are prominent in chambers of commerce to-day. The reasons for the change are much discussed, and need not be repeated here in detail. Things possible in the formative period of industrial establishment in a country will not be duplicated in a period notable for the advanced state of its industrial development. The tendency to-day is not to make employers out of employees but employees out of employers. But we shall not say, because of that fact, that it is not an improvement over the day which witnessed the humble beginnings in mechanical and mercantile life, of the heads of our great commercial bodies. To be an employer and manager of men is not the acme of achievement in manufacturing and business.

Better than the conditions under which so-called self-made men who are directing affairs to-day have come up, are the conditions of to-day which make "Excelsior" the foremost motto of the ambitious young man in shop and business. Where the estate of employer has been the goal of the ambitious employee, now there is no goal except the continually changing one of achievement greater than yesterday's. The steady plodding method of the last generation, that brought the boy who worked as apprentice alongside his employer, up and up until he stood in his employer's place, is succeeded by so high a standard for the ambitious employee that only the fittest, the most skillful, the most thoroughly trained can hold even subordinate positions in the complex organization of modern business. It requires far more talent, moreover, to be even an average lieutenant in the industrial army to-day than was required to come to the estate of employer, under the impetus of the amazing industrial growth of the past 20 years.

The ambition of a capable, industrious and aspiring employee is not quenched by the changed conditions, but rather stimulated. In a day when the road to preferment in industry is through the technical school, and when brains count as in no other period, in the race for the highest places, it is well to adjust our thinking to the new conditions. It is a mistake to hold out proprietorship as the great goal. Rather let emphasis be laid upon the larger equipment and the vastly higher skill and originating power that men must have to achieve success in

any place and in any line, in this day of highly organized business and of unparalleled aggregations of capital.

PHASES OF THE WAR CLAMOR.

When the history made in the United States in the past few weeks comes to be viewed from the proper distance, two features of it will appear in a light anything but creditable to the American people—the war-mad spirit of the United States Senate, and the vicious and indecent attacks of certain newspapers and Congressmen upon the President. The Senate has demonstrated again that it is no longer to be considered the conservative, restraining force in National legislation; and the insensate clamor of many newspapers through these critical days has given fresh proof that the marketing of sensations is a larger function of the press of to-day than furnishing the people with truthful information that will help them to right judgments. The disgraceful occurrence in the House, in the midst of what was presumed to be a deliberation on the most momentous question before that body in 30 years, was not calculated to inspire the world with respect for our self-restraint. Nor was the marked difference of opinion in Congress as to our reasons for going to war likely to convince other nations that the step taken was in response to an irresistible demand of the people. The Senate's railing accusation against Spain, putting the brand of cruelty and deception on all her record as a nation, savored strongly of going to war with her because of her general bad reputation rather than for the definite reasons set forth in the President's message. Now that war has begun, a prime source of confidence is in the fact that the commander-in-chief of our armies has made no mistakes in his handling of this matter from the beginning. If the use of the army and navy had been put in his hands as a measure of war prevention, he might have accomplished that end by the stronger pressure he could have put upon Spain, who already had yielded far more than would have been predicted six months ago. Believing this, we are confident that the President's conduct of the war which Congress has precipitated will be the wisest, the most humane and the best calculated to secure the ends for which he has been manfully striving.

HOME IMPEDIMENTS TO OUTER TRADE.

It has been pointed out repeatedly, in connection with the associated efforts of our manufacturers to extend their trade in other countries, and particularly in Latin America, that conventions and commissions, banquets and junkets must not take the place of a study of the wants and commercial methods of those countries. Criticisms of the American plan for the capture of South American trade have come from our Southern neighbors, from time to time, but the Buenos Ayres *Herald* of recent date gives perhaps the most unsparing and the plainest-spoken. Some of our guests at the last Pan-American trade conference at Philadelphia more politely said the same thing, but the advice seems not to have worked a cure.

The *Herald* article, forwarded to the State Department by our consul at Montevideo, says that American merchants and manufacturers have failed to increase their trade in Argentina because they take no pains to make "prosaic arrangements for the doing of the business sought." It is added that Americans "do not know whether Argentina is in Brazil or Brazil is in Argentina, or whether both are in Peru; and they have not the slightest conception of business conditions there, nor have they any thought that they have to conform to these conditions if they would come here as exporters." Our manufacturers, the article says, have lost large deals because they refused Buenos Ayres merchants the same terms the latter could secure from any European seller. South American countries will not come to the methods of the United States, and the *Herald* says of the "brass band demonstrations of itinerant commissions" that because they have nothing else behind them they are the laughing stock of the South American market. Exhibits of the products of the United States, it says, are not the thing needful, because the people there know very much more about what the United States can produce than the people of the United States know about what South Americans will buy. We are told in conclusion that the United States can do a large business in the Southern countries "whenever it will meet the conditions of this market and those of the exporters from Europe, and not before, and no exhibition or itinerant commission will change these stubborn facts and conditions."

While not intensely friendly in its tone, this criticism is nevertheless instructive. It indicates that the same reasons exist to day for failures in South American trade extension that have been emphasized in three years of discussion of ways and means. If education is still needed at this end of the line that fact is worth knowing and heeding.

Connellsville Coke Trade for Three Months.

The *Courier* in its current issue says: "Coke statistics show that the trade of the Connellsville region has remained practically stationary during the first quarter of 1898. There is nothing discouraging about this statement, however as the production has been and is at a maximum figure. If maintained throughout the year, the coke trade of 1898 will prove a record breaker, surpassing even the great boom year of 1895, when the production exceeded 8,000,000 tons. The record of the past three months is comprehensively shown in the following tabulated statement:

Month.	Cars.	Daily Av.	Tons.
January	38,348	1,475	727,739
February	35,125	1,463	667,287
March	39,264	1,454	744,987
Totals	112,737	1,464	2,140,013

"At this rate, the output for the year will reach the enormous aggregate of 8,560,000 tons as against 8,244,438 tons in 1895."

The estimated weekly production is given, week by week for the first three months, being 152,377 tons at the beginning of the year, rising to 156,094 tons the next week, falling to 151,790 in the second week of February and running close to 156,000 tons in March. Concerning prices, the statement is made: "It is a rather remarkable fact that in the face of this steady boom in trade, prices have not strengthened, but on the contrary have dropped still lower than the average for 1897. There are few new ovens building, but this is not surprising, inasmuch as the capacity of the region is now greater than the demand promises ever to be. About 15,000 of the 18,000 ovens in the region seem sufficient to keep up the supply of Connellsville coke. A considerable portion of these 3,000 idle ovens are unserviceable, being in a state of decay, but making due allowance for this fact, there are still more than sufficient ovens to fill all orders. This fact more than any other accounts for the weakness in prices. It is hardly probable, however, that prices will go much lower."

IRON AND STEEL TONNAGE OF THE VALLEYS.

Secretary James H. Nutt, of Youngstown, O., has recently made up the statistics for 1897, of the Mahoning and Shenango Iron Manufacturers' Association. They include a tonnage statement of the shipments and receipts of the blast furnaces and rolling mills in the two valleys that belong to the association. New Castle, with its important blast furnace, steel works, tin plate, wire and wire nail and tube interests is not included:

ROLLING MILLS.

Shipments.

	1897.	1896.	1895.
Number gross tons muck bar	25,293	172,334	170,877
Number net tons finished iron, including bar, band, hoop, sheet, shafting, spikes, washers, nuts, bolts and wrought iron pipe	325,109	251,708	378,763
Number gross tons mill cinder	66 833	49,701	61,460
Number gross tons billets, slabs, etc	330,500	.....	.....
Total tons	747,735	473 743	611,110

Receipts.

Number tons pig iron	461,525	248,189	305 273
Number tons ore	34,737	34,372	44,833
Number tons muck bar, plate and skelp iron	45,075	33,446	63 785
Number tons billets	77,836	66,112	95,430
Number tons scrap iron and old rails	98,042	75 343	114 348
Number tons slack and coal	543,028	468,459	676,799
Number tons brick and fire clay	11,813	19,960	10,535
Number tons sand	14,173	13,293	26,772
Total tons	1,286,829	959,174	1,337,775

It will be noticed that no figures are given for the billet and slab shipments in 1896 and 1895. In those years the billet statistics were not gathered separately, but being regarded as semi-raw material shipped to other mills to be worked into finished product, were counted under the head of "muck bar." Manifestly this gives an erroneous impression as to the trend of affairs in the valleys, as regards iron and steel. The old classification accounts for the large tonnage under muck bar shipments in 1896 and 1895, and the new and correct way, which separates billets, explains the drop in muck bar shipments from upwards of 170,000 tons in 1895 and 1896 to 25,000 tons in 1897.

The statistics throw little light on the question of the relative status of iron and steel. It is known by those competent to judge, however, that there is far less puddling to-day in comparison with the tonnage of finished material than at any time in the history of the business. Much more iron was puddled in the Mahoning and Shenango valleys from July 1, 1897, and April 1, 1898, than in the same period of the preceding year; but this is accounted for by the very largely increased tonnage of the finishing mills in this period. But while more iron has been made, the increase in use of steel has also been very large. The increase in the receipts of pig iron are due chiefly to the large operations of the Ohio Steel Co. in the past year. The Shenango Valley Steel Co. is not included in the statement.

The tonnage handled by the blast furnaces was as follows:

BLAST FURNACES.

Shipments.

	1897.	1896.	1895.
Number gross tons pig iron	932,569	463,822	896,140
Stock on hand	178,723	197,348	74,690

Receipts.

Number gross tons ore	1,549,659	974,437	1,617,211
Number gross tons cinder	91,688	81,705	92,261
Number net tons coke	1,027,923	765,436	1,084,413
Number net tons slack and coal	52,892	37,167	65,145
Number net tons limestone	425,401	339,549	438,090
Number net tons sand	41,564	27,995	57,681
Total tons	3,189,427	2,226,289	3,354,801

The following statistics are given relative to the blast furnaces. They include but eight months of 1897, because the association only began with May 1 to collect monthly statistics:

PRODUCTION AND SHIPMENTS OF PIG IRON.

Month.	Number of stacks. In	Out.	Production.	Shipments.	Stocks on hand at mills and furnaces.
May	3	14	45,290	57,252	269,550
June	3	14	39,501	51,944	208,629
July	3	14	35,151	32,242	192,781
August	8	9	56,829	50,406	209,709
September	15	2	75,595	90,376	178,856
October	15	2	93,642	87,564	187,358
November	15	2	9,5527	93,228	184,396
December	16	1	98,753	88,022	191,028
			540,288	551,034	

The total amount of money paid to the different railroads for freight was $3,598,583.51 in 1895, $2,411,280.04 in 1896 and $3,150,405.10 in 1897.

PUBLICATIONS RECEIVED.

The copyright of "Rainey's Map of the Monongahela River Coal Region from Pittsburg to the West Virginia Line" has been assigned by C. T. Rainey to N. P. Hyndman, of Pittsburg. A copy of the revised edition of March, 1898, is before us. It is about two feet wide by nearly five feet and gives the location of all the mining properties in a territory 30 by 50 miles. Color is effectively used in indicating the location and extent of the various holdings and workings. The map is of much value to the great coal interests of Western Pennsylvania.

"Modern Switchboards" is the title of a folio of unusual attractiveness, in heavy covers, cloth-bound and embossed, issued by the Cutter Electrical & Mfg. Co., of Philadelphia. The switchboard and appliances are important features of an elctrical installation, and the abundant illustrations and clear letterpress of this volume give an insight into the vast detail which has come with the development of electrical manufacturing. There are chapters on circuit-breaking devices, switchboard construction, low-tension central station switchboards, alternating current switchboards, and the use of circuit-breakers in power transmission.

Laird & Lee, of Chicago, have issued recently in their collection of technical reference books a "Machinists' and Engineers' Pocket Manual," edited by D. B. Dixon. Its compactness and completeness are its chief features. A compilation of rules and solved problems is given, relative to steam engines, boilers and pumps, based on arithmetic and avoiding algebraic formulas. There are also data of great value in the machine shop, draughting room and power plant; a dictionary of machine shop, steam engineering and electrical terms; description of the construction and operation of dynamos and motors; facts concerning gearing, shafting, lathe screw-cutting, etc., and a comprehensive digest of information concerning indicator practice, with illustrations. Giving so large an amount of information valuable to artisans, the manual will no doubt be in general demand. The binding is leather, and the price, $1.

The 1898 catalogue of the Lunkenheimer Co., Cincinnati, 4¾ by 7⅛ inches, consists of 208 pages of illustration and details of the company's well known steam specialties — valves, whistles, lubricators, oil and grease cups. In the past year important additions have been made to the Lunkenheimer plant in new buildings and machinery, and the facilities thus provided for the manufacture of iron and brass goods, suitable for steam, water, gas and oil service are exceptional.

In a supplement to its Catalogue C and D, the Q. & C. Co., Chicago, illustrates its Stanwood steel car steps, self-feeding rail drills, compound lever jacks, M. C. B., standard steel brake shoe keys, portable rail saws for track work and portable cold saws for frogs, crossings and switch work. The complete catalogue, which will be sent on application, gives details of the Q. & C. shop saws, with automatic feed, the Q. & C.-Scott boiler feeder.

The Sargent Co., Chicago, maker of steel castings and brake shoes, has sent out with its compliments a Rand, McNally & Co. map of the world, with maps of Cuba and the other islands in that vicinity on the reverse side of the sheet. The company will send them to railroad men and users of steel castings on application to its offices, in the Old Colony Bldg., Chicago.

THE Herman Time Detector Co., of Youngstown, O., recently organized for the manufacture of time recording devices, has been quite successful in introducing its mechanism. Installations made some time ago at the plants of the Youngstown Foundry & Machine Co. and the Enterprise Boiler Co., have done excellent work and the outlook for the general use of this company's detector is reported to be very satisfactory.

MILLER, WAGONER, FIESER & CO., sales agents, Columbus, O., announce that owing to the increased demand for its iron, the Sheffield Coal, Iron & Steel Co., of Sheffield, Ala., has just put into blast stack No. 3, thus increasing its output to nearly 500 tons per day. The company has secured control of the West Point ore fields, insuring an unlimited supply of ore. The selling firm has made corresponding changes in its facilities, so as to handle properly the increased output, through its Columbus, Chicago, Pittsburg and St. Louis offices.

PITTSBURG FOUNDRYMEN'S ASSOCIATION.

Thirty-four members were present Monday night, April 25, at one of the most successful meetings of the Pittsburg Foundrymen's Association since its organization two years ago. The meeting was held at the association rooms in the Builders' Exchange and was presided over by President Robert Taylor. There were present: Secretary F. H. Zimmers, Union Foundry & Machine Co.; E. A. Uehling, the Uehling Method of Casting and Conveying Metals; J. S. Seaman, Seaman-Sleeth Co.; Wm. Yagle, Wm. Yagle & Co.; Dr. Richard Moldenke, McConway & Torley Co.; Thos. D. West, The T. D. West Foundry Co., Sharpsville, Pa.; Paul Kreutzpointner, Altoona, Pa.; T. W. Friend, Clinton Iron & Steel Co.; H. M. Wilson, and W. T. Mobberley, Taylor, Wilson & Co.; Isaac W. Frank, Frank-Kneeland Machine Co.; Samuel W. Hay, Whiting Foundry Equipment Co.; James Scott, Lucy Furnaces; S. A. Benner, Carnegie Steel Co., Ltd.; S. H. Stupakoff, Union Switch & Signal Co.; James McDonald, Jas. Boyle, Westinghouse Electric & Mfg. Co.; Jno. A. Meighan, Dawson Bros. & Meighan; D. A. Thomas, C. Bauer, Sterritt & Thomas; Mr. Kerrins, Robinson-Rea Mfg. Co.; John A. Logan, Mr. Bowman, Jones & Laughlins, Ltd.; C. Wike, Hall Steam Pump Co; Philip Mathes, Brittain & Mathes Co.; J. S. McCormick, J. S. McCormick Co.; Robt. Carter, C. A. Stroh, Mackintosh, Hemphill & Co.; E. A. Kebler, Mathew Addy & Co.; James Altsman, James Collord; Jno. R. Gilmour, Hydraulic Machine Co.; C. W. Jones, Rosedale Foundry Co.; Jas. R. Mills, Jr., *The Iron Trade Review.*

Mr. Paul Kreutzpointer of Altoona, presented the valuable paper printed elsewhere in this issue, on "Difficulties Encountered in Testing Cast Iron." Mr. Kreutzpointer had provide samples of iron and steel, and illustrated the various peculiarities in structure as they were passed. The paper was much enlivened by the explanatory remarks of Mr. Kreutzpointer interspersed throughout its reading. A recess of ten minutes was taken for closer inspection of the samples. The discussion later on was participated in by Mr. Frank, Dr. Moldenke, Mr. West and Mr. Kebler, and Mr. Kreutzpointer spoke further as to causes of segregation, bringing out the point that excessive sulphur and phosphorus segregated more readily than other elements, thus rendering the points of segregation particularly weak. It was wise, therefore, after care had been taken to get a correct mixture, to postpone pouring of the iron as long as practicable, avoiding both extreme heat and rapid cooling.

A vote of thanks was tendered Mr. Kreutzpointer.

Mr. West's paper, on the "Need of Greater Uniformity in Pig Iron Analyses," which was read by title at the last meeting, was brought up for discussion and the secretary announced the receipt of a large number of letters on the paper. It was requested that these be printed and they will accordingly appear in our next issue. On opening the discussion Mr. West explained that many chemists had wholly misunderstood the intention of the paper, which had not been to criticise any particular method of analysis but to show what variations could result in employing different methods, in the rapid every-day workings of a laboratory, even in the hands of able and careful chemists, unless there be some system of checking the findings of the method used.

Dr. Richard Moldenke contributed the following to the discussion: "No set of analyses of pig irons has ever come under my notice which shows so plainly the need of greater uniformity in this class of work. What is the value of this investigation to the foundryman who makes use of chemical methods for mixing his irons? It shows him that he is not always obtaining what he asks for, and furthermore that this may oe the case without any attempt on the part of the furnace to be a little lax in the interpretation of the pig iron specifications. The principal causes of these wide differences in results on the part of supposedly expert chemists are threefold:—The sample, the method, and the man. First class chemicals obtained through first class houses seldom give trouble in the laboratory. So far as the man is concerned in this series of tests, this point can be dismissed without further comment, as all knew what was required and without question did their best.

"The sample is another matter. The three samples I received contained a gritty material, which did not surprise me, as all samples of pig iron run that way. Even when separation is affected with a magnet, there will remain in the iron a certain quantity of mechanically mixed slag which is visible only under the microscope. The first thing every chemist does with samples of pig iron is to clean them with the aid of the magnet. The following shows what came from my samples:

Pig Iron.	Residue in Sample.	Silica in Sample.
Foundry iron	0.39%	0.025%
Charcoal iron	0.07%	0.012%
Bessemer iron	0.21%	0.054%

"The greater part of this residue was evidently scale and not sand. At any rate, only the Bessemer iron would be affected seriously, the charcoal iron being practically clean. This residue, so far as my samples are concerned, will not account for the great variation in the silicons, and certainly not in the other items of the tables, with the exception of the graphites, in the case of which every one acquainted with the constitution of cast iron will at once be prepared for a wide diversity of results.

"To my mind it is entirely a question of method, and here we are face to face with a difficulty experienced by all chemists. The national and international committees have not yet agreed upon standard methods, but as this is fairly on the way, all attempts at establishing laboratories to adjust this matter are uncalled for, in fact detrimental. But we have the example of the Pennsylvania Railroad which issues definite, and by the way, excellent methods of chemical analysis by which its own purchases are tested. Whoever wishes to supply this company will find it advantageous to carry out his tests by these methods, and thus avoid possible rejection on account of differences similar to those Mr. West has shown to exist.

The natural inference would be, after obtaining uniform and clean samples of iron, to send them out with their analyses and printed methods. It is to be understood that such samples are not to be used as standards are in steel analysis, but simply as material for the chemist to work upon to check the accuracy of his manipulation. He should, therefore, use the method given, whatever other one he finds most convenient for his daily work. When the time comes for the promulgation of standard methods, the question will be settled definitely.

"The next point to be considered is, what should be the attitude of the foundrymen's associations to the question propounded by Mr. West? To my mind the use of chemical methods of mixing irons in foundries has come to stay, and eventually nine-tenths of the work will be done not by educated chemists, but by analysts trained from the ranks. I have in mind as I write two successful cases of this kind in small foundries connected with large works. In view of this Mr. West's idea should receive our close attention. It would seem unwise to commit the American Foundrymen's Association to the establishment of a central laboratory, but it could readily lend its influence and if necessary its assistance, to some well known private institution of good repute, which could undertake the preparation and distribution of the proper material, checked by such chemists as Booth, Garret, and Blair. There would be no difficulty in carrying this out, and with this in view I can heartily second Mr. West's efforts in obtaining something of value not only to foundrymen but also to chemists, from the remarkable series of analyses he has published."

Messrs. Frank, Scott, Uehling, and Kreutzpointer also participated in the discussion. It was the sense of the association that the subject should be carried to the meeting of the American Foundrymen's Association at Cincinnati, and on motion President Taylor appointed Messrs. West and Frank and Dr. Moldenke as a committee for this purpose.

Mr. Seaman and Mr. Frank suggested that the matter of Pittsburg representation at the Cincinnati meeting of the American Foundrymen's Association be entrusted to a committee of three, who, beside working for a large delegation should also secure rates and report at the May meeting. The chair appointed Wm. Yagle, Phillip Mathes and J. R. Mills, Jr.

AT Reading, Pa., a permit has been issued to the Carpenter Steel Co. for the erection of a one-story iron building, 48 x 64 feet.

LAKE SUPERIOR IRON MINES.

A Duluth dispatch of April 21 says: John M. Sellers, Robert W. Hunt and Morris Sellers began an action in district court yesterday against the Sellers Ore Co., in which it is alleged that the company threatens to dispose of the mining lease to lands in sections 6-57-20, and the plaintiffs ask that in the event that the threat to sell the lease is carried into effect the company be restrained from disposing of it to anybody but John M. Sellers. The complaint sets forth that the Sellers Ore Co. is capitalized at $500,000, fully paid up, and that the plaintiffs own one-third of this stock. It is alleged that in 1896 the company operated the mine owned by it and cleared $50,000 and that in 1897 the plaintiffs were willing to continue to operate the mine, but the defendant stockholders were in the majority and refused to allow the work to proceed and the company lost $44,000 and have since refused to allow the mine to operate. It is alleged that the defendant stockholders held a meeting on April 19 and a resolution was adopted authorizing the president and secretary, William C. Fownes and J. Ramsey Speer, to sell the lease in violation of an agreement with John M. Sellers, which requires that he be given 30 days' notice. Before this resolution was voted on it is set forth that a protest signed by each of the plaintiffs was served on the directors. It is further alleged that the value of the lease to John M. Sellers is $50,000 and that when the lease is sold the company will be wholly insolvent and that the above amount will be lost.

The Minnesota Iron Co. does not publish annual reports, but the figures which have been made up for directors show that earnings in 1897 were very much in excess of 6 per cent on the stock, and there is no question of the payment of that rate quarterly at least for this year. For 1898 sales are largely in excess of any on record at this time of the year.

No negotiations are pending, as stated in recent dispatches, for the acquisition of the Lake Superior Iron Co.'s mines by the Cleveland-Cliffs Iron Co. There is no present prospect, moreover, that such a deal will be made.

The lease of the Mahoning mine, on the Mesabi range, made by Wright, Davis & Co., and the estates of C. W. Wells, and F. C. Stone, has been put on file recently. It provides for a royalty on a sliding scale, as follows: 27½c on a minimum output of 150,000 tons; 17½c for more than 700,000 tons; 15c for more than 1,000,000 tons, and 12½c for more than 1,500,000 tons.

The new concentrating works of the Pewabic Co., at Iron Mountain, Mich,, are now about ready to start up.

The Dunn mine at Crystal Falls., Mich., will make a large output this season, having recently increased its working force.

At the Lake Angeline mine, Ishpeming, Mich., a body of silicious ore is being developed in the western end of the property. It is of large extent and overlies the better grade of ore. Average analyses are 45 per cent iron and .035 per cent phosphorus.

Personal.

S. Groves, mechanical engineer of Taylor, Wilson & Co., Ltd., Allegheny, Pa., has sailed for England for a stay of several weeks.

Peter White, Marquette; Samuel Mitchell, Negaunee; John Duncan, Calumet; S. B. Harris, Hancock; Graham Pope, Houghton; William Kelly, Vulcan, all prominent representatives of Michigan mining interests, have been appointed to represent that State at the International Mining Congress to be held in Nevada in July.

A. Tropenas, inventor of the Tropenas steel process, arrived in New York from France this week. He comes over to start the Tropenas plant now being erected at the works of the Driggs-Seabury Gun & Ammunition Co., Derby, Conn. It is his purpose also to visit a number of American steel works.

John L. Stevenson, formerly chief engineer of J. P. Witherow & Co., and later engineer and superintendent of the Ironton Steel Co., of Duluth, has been appointed chief engineer of the firm of Bolckow, Vaughan & Co., Middlesborough, Eng.

W. G. Kernz, superintendent of the American Steel Casting Co., of Alliance, O., has resigned to accept the management of the Morrison-Bailey Steel Co., of Pittsburg.

INDUSTRIAL NOTES.

The J. C. McNeil Co., Akron, O., was placed in the hands of Dr. A. M. Cole, and J. B. Campbell as receivers on April 23. The application was made by Mrs. Mary McNeil, principal stockholder and creditor of the company. The assets are placed at $162,000, while the liabilities are $80,000. The concern has run full for several years with a force of 200 men. It is incorporated for $100,000. Operations will continue.

The Standard Drawn Steel Co., of Cuyahoga Falls, O., has been absorbed by the Shelby Steel Tube Co., of Shelby, O., and the works will be closed.

The wire drawers formerly employed by the HP Nail Co. have accepted the scale offered by the American Steel & Wire Co., and the plant will start up shortly.

Wm. Tod & Co., of Youngstown, O., have received through their Pittsburg office, Seward Babbitt, manager, the contract for the blooming mill engines for the Aenta-Standard Iron & Steel Co.'s plant now under construction at Mingo Junction, O. These engines are 45 inches in diameter, 72 inch stroke, and are direct connected to the rolls, with the Julian Kennedy return crank. It is a duplicate of the pair furnished by the same company, to the Ohio Steel Co., Youngstown, O., and to the Apollo Iron & Steel Co., Apollo, Pa.

A charter has been issued to the Iroquois Iron Works, Buffalo, N. Y., with $100,000 stock. The directors are S. M. Clement, S. T. Viele, R. R. Hefford, Wm. Y. Warren, and W. Grant King, of Buffalo.

A number of citizens of Monongahela City, Pa., have formed an organization and rasied $25,000, to purchase the "Manown bottoms." A proposition has been made by parties desiring to erect a tin mill at the place.

E. F. Berns and August Schlee, proprietors of a foundry now going up at Lyons, N. Y., are negotiating for equipment.

The newly organized Southern Bolt Co., of Birmingham, Ala., of which John M. Caldwell is president, Chas. O. Locke secretary and treasurer, and Samuel Randolph, superintendent. The main building will be of steel, 60x150, and equipped with modern machinery.

The F. E. Young Mfg. Co., of Brooklyn, N. Y., has been incorporated to manufacture beams, implements, etc., from steel, iron, tin, and copper. Capital, $50,000. Directors, Frank E. Young, of 378 Macon st.; W. J. Logan and Jacob Meurer, all of Brooklyn.

The Fulton Foundry Co., Cleveland, capital stock $50,000, has been incorporated to engage in the manufacture of machinery. The incorporators are Charles D. Langdon, Jr., S. W. Tucker, J. H. Dempsey, Charles T. Brooks, and Clarence E. Sanders.

A reorganization of the Hughes Steam Pump Co. has just been completed in the formal incorporation of the Snider-Hughes Co., of Cleveland, capital $100,000, to carry on the business of founders, machinists and builders of pumping machinery. The incorporators are Martin Snider, Clarence A. Snider, H. M. Snider, John V. Stockwell, Jr., and Otho C. Snider.

The Pittsburg Steam Jacket Lubricator Co. is being organized at Pittsburg, by G. L. Brisbin, Wm. Speakman, J. W. and A. L. Carpenter, and John Lemmer. Application will be made on May 6 for papers of incorporation.

H. L. Raub, A. K. Raub and R. M. Reilly, Lancaster, Pa., have chartered the Lancaster Sheet Metal Co., with $25,000 capital stock. The purpose is to manufacture tin plate and other metal sheets.

The Peerless Steel Range Works have been incorporated, at Chicago, to manufacture ranges; capital stock, $10,000. Incorporators, Henry J. Warner, H. W. Lewis, M. H. Lewis.

Chas. C. Jones, of Sharon, Pa., formerly connected with the Douglass Furnace, has gone to Seattle, Wash. He proposes to erect a small blast furnace there and expects to manufacture the iron into cast iron pipe for export to Japan.

The A. W. Stevens Co. has been incorporated at Marinett, Wis., with $600,000 capital stock. The company will erect a large plant and manufacture agricultural implements. It is the successor to a large concern in the East, which goes to the West to save freight charges, most of its trade being in that section.

IMPROVED TUBE-MAKING MACHINERY.

A change in the ordinary Mannesman design of tube making rolls has been devised by Walter Gregg, J. F. Donaghy and John Humphrey, of the Ellwood City, Pa., plant of the Shelby Steel Tube Co. The special object of the improved form of machinery is to prevent the formation of fins and beads which have been an objectionable feature of the ordinary method of tube-rolling. Oppositely-disposed double rolls, having correlative grooves of a new configuration are employed for this purpose, their construction and arrangement being shown in Figs. 1 and 2, the former being an elevation of the rolls and the latter a bottom plan view. In Fig. 3 a diagrammatic view is given showing the relation of the rollers and their grooves at stated intervals in the roughing and finishing operations. In order to make the four co-operating grooves of the rolls form a complete circle as the ultimate section, in the drawing together of the rolls, the grooves 5 are formed with a curvilinear base extending exactly one-quarter of a circle. The remainder of the groove, extending from the curvilinear base to the edge, is a straight line tangential to the curve of the bottom of the groove, the straight portions of the grooves on its opposite sides being disposed at right angles to each other. Thus when the rolls are separated the interior configuration of the four co-operating grooves is of a general circular form, and as the rolls are drawn together the aperture is gradually contracted until a perfect circle or cylinder of the desired size is produced, as illustrated in Fig. 1. The contiguous straight sides of the opposing grooves approach each other with a wedge action; but when they have reached a point at which a fin would be formed the opposing curve of the other set of rolls is presented to such angular portion of the tube and all tendency to bead is obviated.

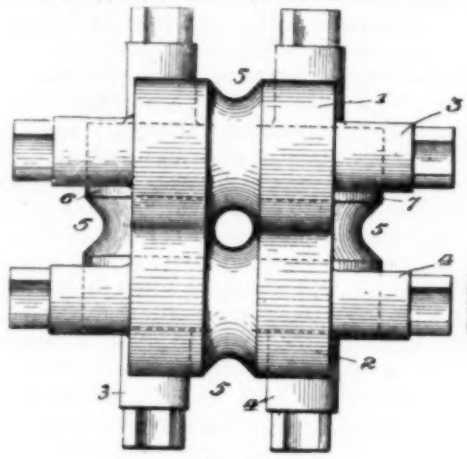


FIG. 1.

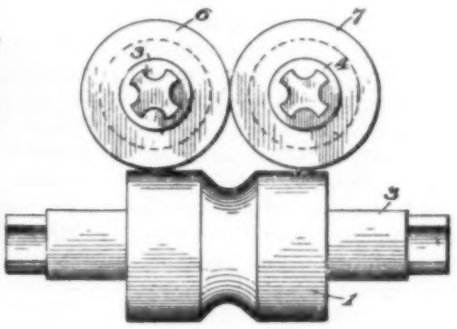


FIG. 2.

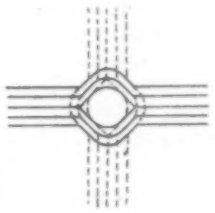


FIG. 3.

IMPROVED TUBE MAKING MACHINERY.

An improvement designed also by the persons named above is illustrated in Fig. 4. It consists of two bevel-faced rolls or disks, arranged at right angles to each other, or any other angle desired, and having their axles in different planes, so that a billet passed between the faces will be engaged at points above and below its center on opposite sides. The arrangement of the rolls is such that a line drawn centrally through the axle of one would pass considerably above or below the central line of the axle of the opposing roll. Thus, by engaging the billet above and below its center, the rolls simultaneously rotate it and feed it forward upon the mandrel 3. Suitable guides are employed to hold the billet in position. The point of contact between the rolls and the billet, it will be seen, are practically in the same transverse plane as the operating portion of the mandrel within the tube, and thus any spreading of the tube because of the operation of the mandrel will be avoided. This invention makes necessary the employment of hydraulic or other means to force the billet forward while being rotated. The feeding forward and rotation of the billet are positive, yet the arrangement is sufficiently yielding to prevent the destruction of the mandrel should the feed be at a faster rate than it is capable of cutting.

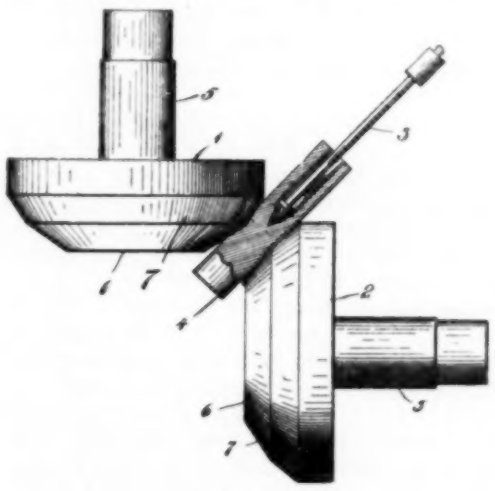


FIG. 4.

THE TIN PLATE MARKET.

There has been no quotable change in the tin plate market, because there has been no business done, except in a very small way from spot stocks in dealers hands and from stock-lists issued by mills. The only interesting feature of the market is the question: What will be the effect of the present war upon the tin plate trade, and assuming that the war continues during the entire season will there be a curtailment in the consumption resulting from generally demoralized conditions? This question is being discussed on all sides by buyers and sellers alike, but as yet no consensus of opinion has been reached.

The market stands as follows, f. o. b. Pittsburg and Indiana districts:

CHARCOAL TINS.

	IC	IX
Calland Grade, tissue packed,	$4.00	$5.00
Allaway Grade,	3.40	4.30

COKE TINS.

IC, 108 lb. Basis weight,	$2.85
100 lb. " "	2.75
95 lb. " "	2.70
90 lb. " "	2.65
85 lb. " "	2.60
80 lb. " "	2.55

WORCESTER GRADE TERNES.

IC, 216 lb., 20 x 28	$5.80
200 lb. "	5.50
190 lb. "	5.40

THE recent sale of 200,000 tons of Franklin ore to the Carnegie Steel Co., Ltd., will give steady operation of that property this season. The price paid is said to have been based on $2.10 for Mountain Iron ore, making Franklin about $2.40, which is practically the figure at which this ore was set down in the schedule the Mesabi producers attempted to agree upon a short time ago.

THE 35,000 tons of steel rails for the Russian Government, the contract for which was taken by the Maryland Steel Co. last week, will be shipped as speedily as possible. The rails will go to Vladivostock to be used in the construction of the Trans-Siberian Road.

DIFFICULTIES ENCOUNTERED IN TESTING CAST IRON.*

BY P. KREUZPOINTNER.

The question of small economics is forcing itself more and more upon the attention and the pocket book of the manufacturer. Testing the physical qualities of materials—of cast iron, in our case—is one of these economics, because it is a prevention of waste; and since waste pays no dividends it is obvious that methods or measures which prevent waste are of money value in direct proportion to the amount of waste prevented. Yet, whenever we begin to try to squeeze metals into the straight-jacket of methods, rules and specifications, we encounter certain difficulties which we cannot overcome without knowing their origin.

Metals, in their formation, possess the essential conditions of minerals, of rocks. The fact that metals are generally malleable does not alter the case. There is iron in nearly all rocks, and if there is more in one class of minerals than in another, enough to make it a metal and malleable, this is merely incidental. However, cast iron is not malleable; hence it approaches the nature of rock more than any other variety of carbonized iron. Mr. H. M. Howe, in his celebrated work, "The Metallurgy of Steel," page 3, says: "In the present stage of our knowledge it seems probable that the conditions in a solidifying steel ingot, and perhaps in many other alloys and similar compounds, resemble those in a solidifying crystalline rock. For we find that the chemical condition of the components of the solidified steel and the size and, probably, the arrangement of its individual crystals are affected according to now unknown laws by changes in its ultimate co nposition, and by the conditions which precede and accompany its solidification and cooling. The influence of cooling on the structure of steel is readily recognized. Slow, undisturbed cooling induces coarse crystallization. If the metal be vigorously hammered during slow cooling, the structure becomes much finer; if the cooling be sudden, extremely fine structure results. That other and now unguessed conditions profoundly alter both the mineral species and the structure of steel, and that changes in ultimate composition modify both species and structure of steel, as of crystalline rock, in most complex ways, is indicated by the utterly anomalous relations between the ultimate composition and the mechanical properties of steel. This anomalousness, which has puzzled so many, is readily explained by the close resemblance between the conditions of the formation of rock and of ingot, which not only shows us why we do not discover these relations, but that in all probability we never can from ultimate composition. The lithologist who attempted to-day to deduce the mechanical properties of a granite from its ultimate composition would be laughed at. Are our metallurgical chemists in a much more reasonable position?"

It is hardly necessary for me to call your attention to the close resemblance of the foregoing to cast iron, with the only difference that cast iron is not malleable, like cast steel. In general appearance there is little difference between the fractured surfaces of cast iron and cast steel. Having familiarized our minds with the idea that cast iron and rock closely resemble each other in structure and that the formation of this structure is in turn subject to the same conditions and influences, both in rock and cast iron, we may proceed a step further and, under the guidance of the teachings of the science of molecular physics, try to ascertain what takes place during the process of cooling in a piece of rock and thus possibly obtain a clue to many of the perplexities obstructing the path upon which we try to reach the goal of good, sound, strong castings.

Before entering, however, upon a detailed discussion of this point, let us see how these perplexities manifest themselves. Only the other day I made some tests of cast iron with the following results. The shrinkage ran all the way from 8-100 to 13-100 of an inch, while the transverse strength varied from 14,000 to 22,000 pounds. The test pieces were 2 inches square; supports were 12 inches apart. Some of the results varied from 14,000 to 19,000 pounds, while the shrinkage remained uniformly at 8-100 of an inch. There were tests with a strength of 14,000 pounds and a shrinkage of 10-100 of an inch, and two tests with a strength of 20,000 pounds and also a shrinkage of 10-100 of an inch. There was a test with a strength of 18,200 pounds, 16-100 of an inch shrinkage and 1-16 inch chill; while the next test gave also 18,200 strength, but a shrinkage of 11-100 of an inch and ⅛ of an inch chill. All these tests were from the same mixture, cast under the same conditions and the manner of testing was identical in every case. Since you are only too familiar with these perplexities, it is not at all necessary to multiply cases.

In order to produce a crystalline body, like rock, steel, or cast iron, or the crystals of minerals of all kinds, there must be a solution. In such a solution there must be dissolved, and be held in suspension, a certain percentage of chemical elements which, when out of that solution, by one cause or another, form themselves into crystals of various shapes, according to the natural affinities of these elements and the laws of crystallization, whatever these may be. A liquid, however, be it water or molten iron, cannot hold the dissolved chemical elements in solution beyond a certain degree of heat, nor any surplus of chemical elements with which the solution may be surcharged or super-saturated. As soon as a certain degree of heat is reached, lower than the one at which all the chemical elements are, and can be held in solution, separation begins and the elements thus separated coagulate and arrange themselves into crystals of various forms. Fluid cast iron and steel being a combination of carbon, silicon, manganese, sulphur, phosphorus, iron, and other elements, it is a matter of great practical importance and interest to the steel maker and foundryman that the combination of iron and other elements, which he holds liquid in his furnace or cupola, consists of the right proportion so as to form well-developed crystals on cooling, of maximum hardness and cohesion, which in turn will result in maximum strength, or ductility, or both, in the resulting metal; and, as a natural consequence, in maximum strength, safety, and economy of the structure for which such metal is to be used.

The author therefore hopes that this distinguished audience may not consider it a waste of time to become somewhat acquainted with the manner of crystallization eventually resulting in the difficulties which we encounter in trying to establish uniform methods of testing cast iron, or in our daily work of testing in general. Even if we are often unable to obviate the causes of these difficulties, nevertheless, the knowledge of their possible source will enable us to work more intelligently and more comprehensively, just as the man seeing the source of danger is better able to make use of his wits and resources to guard against its consequences than if he groped about in the dark, as it were.

The power of a metal to resist the forces which tend to destroy it is a function of the uniformity of structure of the metal. Thus, given an ideal chemical combination of iron and other elements, or liquid mass of metal, and conditions of subsequent cooling preventing a uniform distribution, through every crystal, of the proper percentage of the elements, leave more in one place than in another, then the natural consequence will be that some crystals in one portion of a casting will be more fully developed, will be larger, stronger, better fitted for work, than the crystals in another part of the casting where the proper proportions of elements have been wanting, and the crystals were starved, so to speak, for want of proper food, and as a consequence are puny, ill-shaped and weak in body. But not only that. There being a surcharge or super-saturation of the metal in one place, it may happen that the solution is of such a kind as to be unable to hold just such a percentage of a given chemical element, and no more, on cooling, and then we encounter that baneful difficulty in castings of iron and steel—segregation, which means a spot or portion of an ingot or casting where the surplus of chemical elements is concentrated, either because there was a surplus of them held in solution in the liquid mass, or because unfavorable conditions of cooling retained more of them in one place, that is, prevented uniform distribution of the elements, as pointed out above. Concerning segregation, we find a partial explanation of this phenomenon in Lehman's "Molecular Physics," page 740. It says:

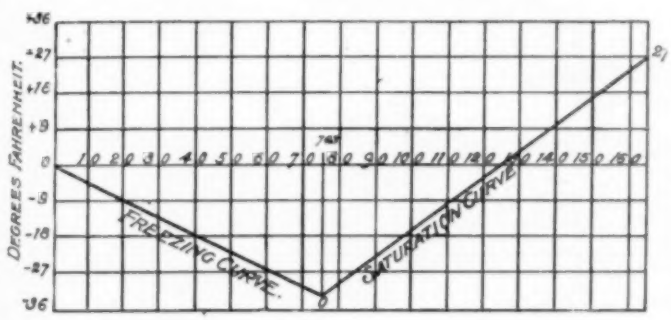
"There is invariably a minimum of temperature controlling the melting and solidification of a given proportion of a mix ture of elements. If a liquid mixture containing the given proportions of elements is cooled, then all the parts of the mix-

*Read before the Pittsburg Foundrymen's Association, April 25, 1898.

ture solidify uniformly at a minimum temperature. If the mixture, however, is composed of proportions of elements not solidifying uniformly at a given minimum temperature, then the surplus of elements present will solidify at a temperature higher than the given minimum." The working of this law is illustrated in the accompanying diagram, which is taken from the work referred to.

"If water and salt are mixed, that is, if we take a solution of salt in water and the solution holds less than 76.3 per cent of salt, then, on cooling to a minimum temperature, or zero in the diagram, ice separates, or segregates out. Since, by virtue of this separating out of ice, or solidified water, the percentage of water to percentage of salt has been diminished, as a consequence the percentage of salt in the solution has been increased proportionately toward the limit of 76.3 per cent, and at the same time comes nearer to the freezing point, or minimum temperature of that mixture which lies at 63.5° F. If, however, the solution contains more than 76.3 per cent of salt to 100 parts of water, then on cooling salt is separated, or segregated. Thus, by virtue of this separation, the solution comes nearer to that point where solidification takes place at a minimum of temperature. If the solution holds just the limited proportion of salt, 76.3 per cent, then neither ice nor salt is separated, or segregated out, until the solution is cooled to 63.5° F. The contrary happens if heat is applied to the solidified mass. As long as ice and salt is frozen, or solidified, in proportional limited quantities, then the solidified mass will become a liquid solution again at a minimum temperature. If there be a surplus of ice or salt then, in order to liquify that surplus, the temperature must be changed and raised. Thus there will be a constant temperature at which a solidified mass of properly proportioned ice and salt liquifies, just the same as with any other solid body."

Now, since liquid masses of metallic substances are subject to the same laws of crystallization as liquid masses of mineral



substances—because iron is a mineral like quartz, the only essential difference being an excess of iron in the one and an excess of silicious matter in the other—we can readily conceive what an endless variety of action and reaction may take place, and probably does take place in a liquid mass of iron while it is being run out of the converter, the furnace or cupola, and while passing from the liquid state, quickly or slowly, as the case may be, into the solid state. If we comprehend the somewhat complex action of so simple a solution as water and salt, we can readily imagine the almost incomprehensible complexity of conditions arising in a cooling mass of cast iron, which, of all classes of cast metals, is composed of a maximum of elements besides iron and carbon, by the partial or complete absorption, saturation, equalization, segregation, exchange and interchange of the various elements, according to their affinity, the law of crystallization, degree of heat, of melting and rate of cooling. Thus, according to the example of the solution of salt water, we can imagine an excess of sulphur being segregated out at the point of saturation with sulphur of the other elements, provided there be sufficient heat and time in cooling to favor complete saturation of one element with another element, most congenial to its nature. Supposing that ideal state has not been reached, then we have a disproportion of elements, a want of equilibrium, as it were, whereby the physical qualities of the metal are influenced in a manner unknown and puzzling and not seldom very perplexing to both the foundryman and the engineer. And what happens with one element like sulphur will of course happen with any one of the other elements, or two or three of them at a time, according, not only to the percentage present of these elements, but also to the readiness of each one individually and all of them collectively, to absorb, to become saturated with one or all of the elements each or all can absorb, thus forming a chemical composition in complete equilibrium of elements, as distinct from a state where the elements are unbalanced chemically or form merely partial mechanical mixtures. This is illustrated in the case of sulphur which has been found in dross and fine streaks, or in the well-known case of carbon segregating out in the form of graphite; more so, as you all know, if one or more elements are present which hinder the saturation of the iron with carbon. In these reciprocal effects of absorption and segregation, of solution and saturation of the varying and ever variable elements composing cast iron and steel complicated still more by the melting point and rate of cooling, we find the reasons and causes for the difficulties we encounter in testing cast iron and steel for their physical qualities, but more so in cast iron, because of the greater percentages and number of elements present and the variation of percentages of these elements.

In designing, therefore, or specifying test bars for standard use, these facts have to be taken into consideration in order to avoid dissatisfaction, distrust, confusion and misunderstanding. All the more so since, even with an ideal mixture, never attainable in everyday practice, the rate of cooling influences the physical qualities of cast iron in different portions of a casting differently, the portions cooling quickly being of finer grain, giving higher in tensile strength than the portions cooling more slowly, and therefore having a larger grain, or crystals, if you please. In steel ingots and steel castings, where the number and percentages of elements other than iron are much less than in ordinary cast iron, these influences of the melting point and rate of cooling do not become so prominent, and in the case of hammering or rolling the steel are equalized to a greater or less extent.

In this connection it may also be interesting to note the remarks of Prof. A. Martens, director of the Royal Prussian Testing Department, who is acknowledged to be one of the highest authorities on physical metallurgy, practical as well as theoretical. In a lecture on cast iron he said:

"Iron has, like water, the ability to absorb and dissolve various elements, according to the degree of heat, and like water, on cooling, segregates out these elements, one after the other. Graphite, for instance, often separates from the iron when the latter leaves the furnace. . . . When the cooling has reached a certain point no more outward separation can take place, and the various elements become free within the mass. At that stage, it appears, a tendency prevails for certain elements to form groups and for these groups to locally separate, or segregate out."

Thus, then, if we go down in the scale of temperatures from the highest degree of fluidity to the point of complete solidification, we have a series of formations of groups of elements, the last of which is decisive of the quality of the metal. Conversely, when heat is applied to the iron the various groups will not melt simultaneously, unless all the elements are proportional to each other, as in a solution of salt water, but will melt at various degrees of heat until at a sufficiently high degree of heat all the elements unite into one homogeneous mass, to separate again on cooling.

Thus far we have considered the question of solution and segregation as a whole, affecting the physical qualities of cast iron. However, we become still more impressed with the reasons why we encounter difficulties in testing cast iron, if we examine into the details of the formation of crystals. Crystals are formed in a solution by the aggregation of certain elements forming eventually a body of angular form. This form is seldom symmetrical in the individual crystals of a mass of metal, apparently because of the crowding of each other while forming, and probably also because of the insufficient time in many instances given for their formation.

As no animal or vegetable product can grow without receiving nourishment from its surroundings, so crystals cannot grow without there being present a sufficiency of those substances in the solution, be that solution a liquid mass of metal, of mineral matter, or a watery liquid. As the roots of a plant extract, absorb and assimilate the nourishing substance on which it thrives, out of the earth surrounding the roots, so a growing crystal extracts, absorbs and assimilates out of the surrounding liquid those substances which, accord-

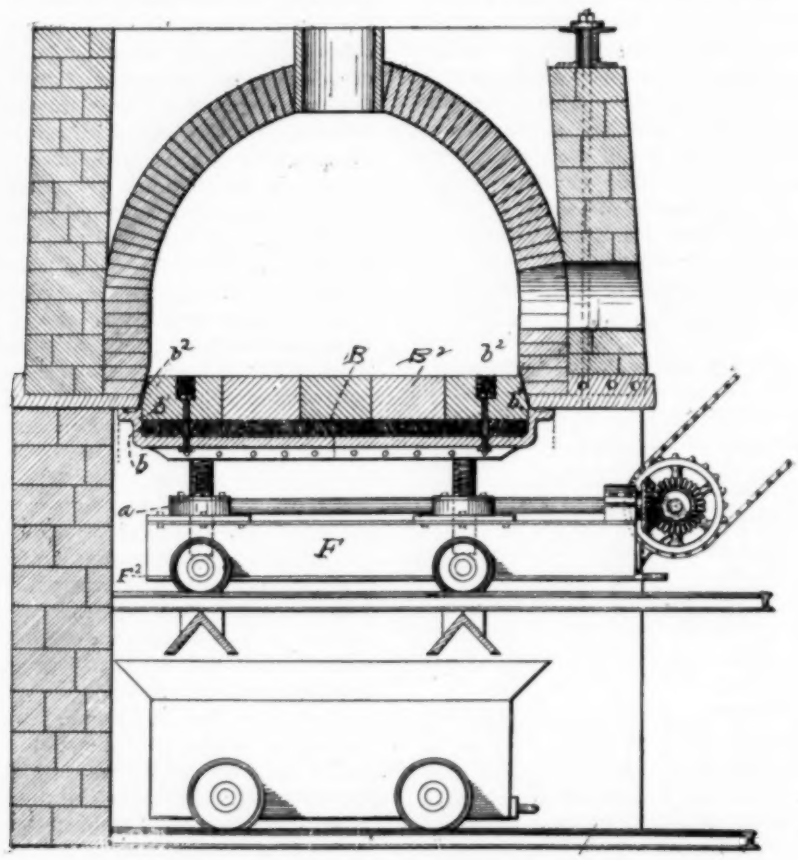
ing to their affinities, are necessary to form a complete and perfect crystal. Therefore, as a plant grows the more vigorous and thrifty the more time is given and the more nourishing substance there is in the soil; similarly the crystals in a solution will be the more complete and perfect the more time there is and the more of the proper substance there is in the solution or cooling liquid mass of metal, other things being equal. Hence the well-known phenomenon of the crystals in iron and steel being larger, the slower the mass of metal cools. Thus we can easily perceive how crystals in iron may become larger or smaller, more regular or irregular, softer or harder, in one case than in another case where the amount of nourishing or crystal-forming substance is deficient in quantity or quality; just as one of two pieces of the same kind of rock is harder or softer or more regular in its texture than the other piece.

Guided by the above very brief consideration of the reciprocal effects of proportionality of chemical elements present in a solution of iron and other substances, of saturation, of melting point and rate of cooling, we find that the difficulties of determining the useful or commercial qualities of a metal by physical test (and incidentally also by chemical analysis), increase with the proportional increase of the chemical elements. And these difficulties are greatest in cast iron because of the heterogenous composition of its elements, which is apt to cause a variation in structure in a piece of cast iron and, as a consequence, a variation in quality in different parts. To represent this difference approximately is the difficulty when we attempt to devise means and methods of testing cast iron. How to overcome these difficulties and use a satisfactory and economical method of testing is not within the scope of this paper to discuss. The author's object was only to call attention to the presence of these difficulties, because as said in the beginning, we can defend ourselves more intelligently if we know the nature and source of the danger we are going to encounter. Whatever these difficulties may be, they should not be considered an obstacle to so intelligent and energetic a body of men as American foundrymen in general, and the Pittsburg foundrymen in particular, but rather an incentive to study the complex phenomena of physical metallurgy carefully, patiently and diligently. The result of these labors should be the much-desired uniformity in methods of testing, for which many of our foremost engineers and metallurgists are striving, through the agency of the International Union for the Unification of Methods of Testing the Materials of Construction.

COKE OVEN WITH REMOVABLE BOTTOM.

An experimental coke oven has been built recently at Port Royal, Pa., on the Baltimore & Ohio Railroad, embodying some features of construction designed by Norton B. Taylor and John C. D'as, of Wilmerding, Pa. The principal novelty consists in making the bottom or platform so that it can be moved vertically and afterward horizontally. After the bottom is lowered sufficiently to clear the setting, the coking operation being finished, it is drawn out and the coke allowed to fall into a car. At the base of the oven, as noted in the sectional illustration a cast iron ring is built in, the inner face of the ring being lightly beveled. Beneath the ring the brickwork of the oven is offset so that a shoulder is formed by the inner end face of the ring, serving as a stop for the upward or return movement of the movable bottom. A truck supports the bottom, which consists of a plate of cast iron, mineral wool or asbestos being used under the bricks or tile, which are seven inches thick and constitute the upper part of the bottom, this arrangement preventing warping of the plate.

The bottom is carried on four screws, these being operated by worm-gearing driven by the sprocket wheel shown. The bottom being lowered, the coke is scraped off by the edge of the ring in the base of the oven, and falls into the car provided below. An asbestos packing ring is used between the joints on the bottom of the oven, to make it air-tight. Loam can be used if desired. Information concerning the operation of the oven will be furnished by N. B. Taylor, Wilmerding.



COKE OVEN WITH REMOVABLE BOTTOM.

Obituary.

Angus Smith, the well known Milwaukee capitalist, identified with the commercial life of that city for 40 years, died April 22, aged 75. Mr. Smith built the first grain elevator in Milwaukee and was one of the original owners of the Milwaukee & Northern Railroad. He was the principal owner of the Aragon iron mine, at Norway, Mich., acquired last year by the Commonwealth Iron Co.

D. C. Templeton, Western agent of the Aliquippa Steel Co., Pittsburg, died last week, at his home in Chicago. Mr. Templeton was born in March, 1845, near Freeport, Ill., and in 1868 graduated from Monmouth College. His wife and three children survive him.

THE KERN FOOT-POWER FORGE HAMMER.

A new foot-power forge hammer has recently been designed by A. L. Kern, of Oil City, Pa., its principal feature being the vertical travel of the head or ram in V-shaped guides in the housing. The object in view was to so construct a tool that while the head or ram travels in vertical guides, the dies may be parallel at any intermediate distance from the anvil block. A number of efforts have been made in the direction of improvements on foot-power hammers,

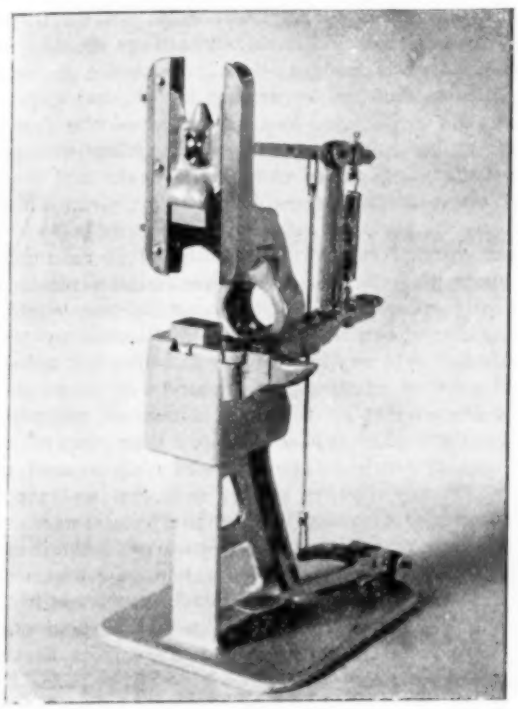


FIG. 1.—KERN FOOT-POWER FORGE HAMMER.

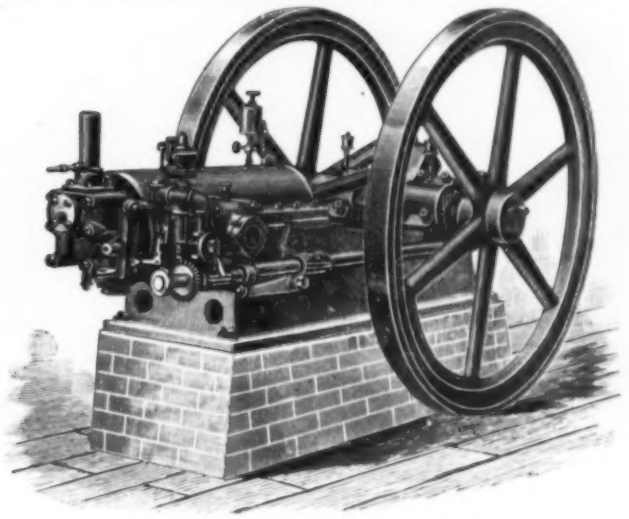
and in none of them has there been an effort to break loose from the old idea of radial motion or blow, which has been very objectionable to hammer operators. The Kern foot-power forge hammer will work stock any width or thickness which can be affected by the full capacity of the blow.

The cut presents all the principal features of the hammer: The vertical travel of the head or ram; the friction rollers in connection with the helve; the adjustable steel bolt which is used in the slotted hole of the top of the fulcrum; and the slip pocket or cleats, which are made fast to the side of the anvil block, are very convenient for sticking in a small extension table or plate for the use of smith tools, bending forms, etc.

The designer has recently made a test of the capacity of the blow of this hammer. With a head or ram weighing 42 lbs., including die, and a travel of 14 inches it developed a blow of 4,190 lbs. The hammer weighs about 1,000 lbs., ready for shipment. It is manufactured by A. L. Kern, at Oil City, Pa.

ST. MARY'S GAS AND GASOLINE ENGINE.

The illustration below is of the type of gas and gasoline engine manufactured by the St. Mary's Machine Co., of St. Mary's, O., who manufactured these engines primarily for their oil field trade, but have put them on the market for general power purposes. They are built in size from 3 to 100 h. p. and represent the results of long experience and testing, and a study of the requirements of economy, saftely, durability and simplicity. The construction is thus described: "The crank shaft is forged steel, turned and polished. The bearing for crank shaft boxes, for wrist pin and the boxes for cross head pin, all long bearings, are of the best material,



ST. MARY'S GAS AND GASOLINE EFGINE.

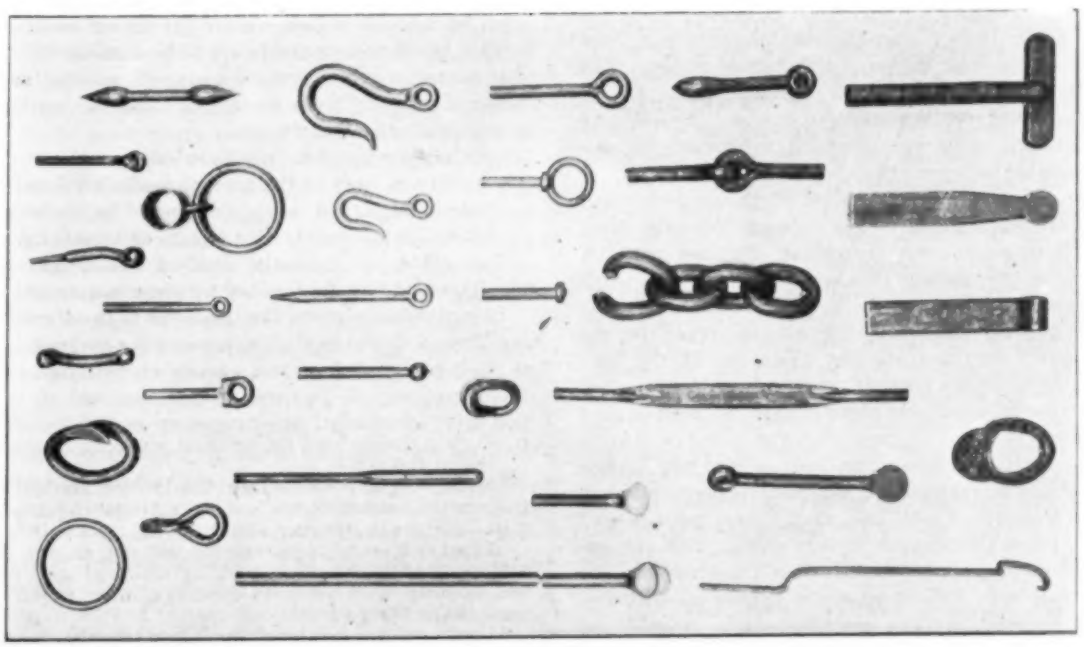


FIG. 2.—SAMPLES OF WORK DONE WITH KERN FOOT-POWER HAMMER.

supplied with the take-ups easily adjusted. The valves are taper seated, one for admission and the other for exhaust. The exhaust valve box is water jacketed. The piston and cylinder are of extra length. The oilers are automatic, requiring no attention, except filling the cups. All working parts of the cylinder are surrounded by a body of water as a guaranty of perfect lubrication. All engines are equipped with this company's friction clutch pulley, which has conspicuously demonstrated its success in the oil field.

At Beaver Falls, Pa., Wm. Gillespie has purchased the Enamel Iron Works from Smith Bros.

SPECIFICATIONS FOR MALLEABLES.*—II.

BY C. L. SULLIVAN.

In submitting these specifications it is not expected that they will be accepted as complete or free from flaws. It is hoped that discussion will follow, with the object of producing a set of specifications under which malleable castings, for railroad uses particularly, may be purchased, and thus avoid the evil s to which reference has been made. It is not thought well to control the manufacturers in any way but in the results, unless it might be in selecting whether the iron shall be cupola or air-furnace melted.

The practice that is followed in gray iron work in casting a test piece in the same mold with the casting proper can hardly be followed in getting malleable iron test-pieces. The condition of gray iron castings is supposed to be uniform throughout in a casting, or in any number of castings from a variety of patterns representing thick and thin sections, while in malleable castings the annealing is most effective on thin sections. Therefore a solid test-piece of malleable iron would hardly represent a lot of malleable castings from a variety of patterns; and a ribbed and cored test-piece that would fairly represent such a lot of castings would be nearly as difficult to make. These are the principal reasons for recommending that test-pieces shall be taken out of a finieshd casting, one or more pieces from different castings (patterns) to be taken at the option of the inspector. Of course in this we would lose the benefit of the skin at the planed edges.

A casting should be selected from a miscellaneous lot that would give a test-piece with the smallest section at or near the middle of the piece. This is to insure the piece not breaking in the jaws of the machine in tensile testing, and to prevent it from breaking on the supports in transverse testing. As there is but little, if any, reduction of area, the cross-section area may be left for determination after breakage. This allows of test-pieces being taken out through flats, ribs, fillets, and coring.

In 1891 and 1892 a committee of the Master Car Builders' Association reported the results of some tests on specimens of malleable iron castings. The finding of the committee was for a tensile strength of from 25,000 to 34,000 pounds per square inch. Since then a considerable advance has been made, and we are justified in expecting better things. The figures for tensile strength that I will recommend are not as high as one manufacturer has expressed a willingness and ability to guarantee. The specifications submitted for discussion and possible revision are as follows:

Tensile Requirements.—At the option of the inspector one, two or three castings of either one or different patterns shall be selected from each 2,000 pounds of finished product. From one or all of the castings thus selected test-pieces shall be cut and prepared, one from each selected casting. The position in the casting from which the test-piece shall be cut is to be determined by the inspector. The size of the test-piece shall be, as nearly as possible, such as will give, when the piece is prepared, a uniform clear length of four inches between the grips of the testing machine, and such as will give, as nearly as possible, a cross-section area of one-half square inch. Tests of one or each of the pieces thus prepared shall show a tensile strength of not less than 40,000 pounds and not more than 47,000 pounds per square inch. The elongation and reduction of area measured after fracture shall be distinctly noticeable as indicating some degree of ductility, and should be at least 1.5 per cent for each. Should the average of three tests show a tensile strength below 43,000 pounds, and coupled with this, if ductility is not plainly discernible, the inspector shall have the option of repeating the test.

Transverse Requirements.—Besides the tensile tests, transverse tests shall be made as follows: From the same castings, or others, at the option of the inspector, one, two or three test-pieces shall be prepared, giving a length of 12 inches between centers of supports and having as nearly as possible a cross-section of one inch square. If there should be any difference in the dimensions of the sides the piece should be set in the machine with the greatest dimensions vertical.

The supports shall be 12 inches apart, center to center, and of the usual shape for making transverse tests of gray iron castings. Tests of one or each of the test-pieces thus prepared shall show an ultimate transverse strength of from 3,900 to 4,800 pounds per square inch, and deflections from 0.35 to 0.65 inches. The average breaking load for any number of tests should be about 4,300 pounds per square inch and the average deflection about 0.5 of an inch. This for specimens of the sizes recommended and for a metal of the characteristics suitable for car castings.

The fractures in both tensile and transverse tests should be fine grained and uniform; blow holes should be absent; bright edges like the chill in chilled castings should generally show distinctly at the edges; the center should generally appear almost as dark as burnt iron. No great dependence, however, can be put upon an examination of the fracture in determining the quality of malleable castings, further than seeing that castings are of uniform fine grain and free from blow holes, as the fracture will vary in appearance according to the size of section.

Bending and Torsional Tests.—Malleable castings which successfully pass the above requirements in tensional and transverse tests will generally successfully pass bending and torsional tests of equivalent severity. Reasonably thin sections, about 3-16 to 9-16 inch thick by about 1 to 3 inches wide should bend over on themselves around a circle at the bend equal in diameter to twice the thickness of the piece and back again straight. And in torsion a thin piece of uniform dimensions, or nearly so, should twist once around without fracture. It only requires proper mixtures and proper annealing, coupled with care in other particulars, to make malleable castings that will weld on themselves; that will draw out to a knife edge on an anvil under a hammer; that will temper and cut soft iron like a cold chisel. Such castings, however, cannot be had at the prices at which some malleable castings are quoted, and probably such qualities are not required in car castings

Notes and Instructions to Inspectors.—All tests should be made at the place of manufacture prior to the shipment of the castings. Extra castings from which to cut test-pieces, or test-pieces cast in molds, and the preparation of test-pieces shall be made at the expense of the manufacturers.

Test-pieces cast in molds are to be furnished if required.

If manufacturers have no means of making tests, the expense of making tests elsewhere shall be borne equally by manufacturer and purchaser.

Purchasers should have a knowledge of the reputation for the quality of work of the several malleable foundries.

Planed and turned test-pieces should be tested occasionally to determine the penetrative effects of annealing.

The effect of suddenly applied loads, corresponding to shocks, should be determined by some convenient tests.

In carload shipments the inspector is to determine whether but three test-pieces shall represent the carload. If a carload is made up by such a great variety of patterns as not to be fairly represented by three test-pieces, and if there is any doubt in the mind of the inspector as to the uniformity of product in the carload lot, he shall test enough pieces to fairly represent the whole lot.

It is almost impossible from the limited amount of information on the subject of malleable castings to determine upon requirements in bending and torsional tests. It is quite certain that one set of requirements will not do for general car and locomotive, machine and agricultural castings. As we are dealing with railroad castings, our requirements are made to fit them only.

If patterns are furnished by manufacturers, inspectors shall insist that all abrupt changes in forms shall be relieved by fillets.

In case of duplicate patterns, castings from same shall compare closely in weight.

All castings shall compare closely with guaranteed weights when in competition with gray iron castings.

Besides making tensile and other tests, inspectors shall closely inspect all castings, rejecting all that show unmistakable defects, such as shrinkage cracks, large ridges at partings, evidence of blow holes, castings badly warped, cracked or broken castings, castings not properly cleaned, castings that are incorrect in important dimensions, due to errors in patterns, castings requiring cleaning, pickling or machining not previously agreed upon.

I might suggest in closing that if it is thought advisable the discussion of this paper can be opened by the presentation of some other figures and notes not properly a part of the specifications, but which might be helpful to them.

*Western Railway Club, March Meeting, 1897.

POWER FROM COMPRESSED AIR.

Compressed air has been abused in its use most shamefully, and until recently none of its friends have been able to be seen or heard, so intensely has the interest of the world been centered upon the marvelous results of the investigation into electrical phenomena. The mysterious has such a fascination for the ordinary mind, and the meteoric developments of electrical science have come so thick and fast, and in so many fields of usefulness, that the average individual could be stampeded into the electrical camp by a mere mention of the name of this most elusive fluid. Now there has come a breathing spell, and the advocates of compressed air are calling attention to the fact that compressed air, properly generated and applied, owns a place in the economics of the day, and this they propose to maintain.

Compressed air has been generally understood to be a most expensive form of power, and has been given sufferance only because of its utility, since for underground work, it really has no rival at any price. Because the laws of compression and expansion of permanent gases belong to the realm of higher mathematics, few understood what they were dealing with, and many of these, unable to overcome the freezing of their motors, did as the public generally did, namely, used the air at practically full stroke and threw away all the intrinsic energy of the air which we can develop by expansion. Theoretically they thus threw away two-thirds of their power, and practically about three-fourths. Ordinary direct-acting pumps and rock drills do not have an efficiency of even 25 per cent.

No small wonder then, that the wood piles have dwindled rapidly away and small power results have been produced. Everything was sacrificed to utility, and compressed air did not take its proper rank until engineers began to realize that it must be used expansively. To use air in an ordinary direct-acting pump is equivalent to throttling a head of water one-fourth of its spouting velocity to accommodate the speed of a wrongly geared water wheel.

I fancy that most of the trouble on the whole subject has arisen from a misconception of what compressed air is in a power sense. Many believe that the power of the engine which compresses the air has been stored in the air compressed, and the more steam they give the engine and the harder it worries and flurries, the more work the air should finally yield up. They do not understand that a pound of compressed air at the same temperature contains the same intrinsic energy, no matter what the pressure is, and this is originally contained in the atmosphere before it is compressed at all. This being the case, no matter what power was expended to compress one pound of air to, say 90 pounds gauge pressure, it will have at the same temperature but one intrinsic potential stored within it. Temperature is the head,—if I may use a term applied to water,—from it comes the power.

Most of the compressed air plants in mines are inefficiently piped, and no attention whatever is paid to long bends, and the pipes in general appear to be specially installed to exhibit every class and variety of pipe fitting the market affords, and with many duplicates. I have counted five one-inch elbows in the space of three feet, to connect up a pump to the main air pipe, when the price of one-inch hose and couplings would have been less and the hose would have delivered to the pump nearly the line pressure. The pressure loss in each of the one-inch elbows would be five-thousandths of the square of the velocity of the air through the pipe. The pump had a 6-inch cylinder and the piston moved 50 feet per minute. The ratio of the cylinder area to the pipe being 1 to 36, the air in the pipe must move 1,800 feet per minute, or 30 feet per second. This squared and multiplied by five one-thousandths makes a loss of 4½ pounds for each elbow, or 22 pounds for the five, certainly not a sensible or desirable result; yet one sees it everywhere in the mines. The passion that miners have for one-inch pipe is marvellous. One may frequently see strings of it, 500 feet long, conveying air. It has cheapness and ease in installment to recommend it, but the wood pile and the owner suffer. A proper plant should have no one-inch air pipe underground over 10 feet long, and no short elbows.

At some convenient place, where the total length of air conduits from the surface motors shall be a minimum, a good reheater should be established and connected to all these motors. There is ample scope to improve upon the reheaters now upon the market. They may be classed as coil, tube and shell reheaters. The first is a simple coil or nest of coils within a furnace; the tube reheater consists of a nest of pipes screwed into a cast-iron head, and all surrounded by a furnace; while the shell reheater is made much like an ordinary domestic sheet-iron heater, except that it will sustain pressure, the fire being within it. Any of these will do fairly well, especially if well insulated on the outside to prevent surface radiation.—[Edward A. Rix, in Cassier's Magazine for May.

PHOTOGRAPHY IN THE SHOP.

A photographer has come to be a very necessary personage in a completely equipped drawing room. The making of pictures of machines and details is becoming more frequent, and the use of half-tones made there from is a prominent feature of modern advertising. It is a simple thing to call in a professional photographer when a machine is fixed up allready for him, but it is expensive, and the results so obtained are often far from satisfactory. A photographer always on the spot, and always ready, has every advantage, not only in availing himself of the most suitable conditions, but in being able to make successive trials if necessary. It is a peculiarity of photography that interested amateurs everywhere are able to do and are doing as good work as the best professionals, so that there should be no difficulty in soon securing the necessary skill, and the shop photographer would then be able to maintain a complete pictorial history of the shop's products and incidents.

But a more valuable service may be rendered by photography in connection with the drawing room. The copying of drawings is shown to be a very simple matter when the apparatus is provided, and when a little experience has been acquired. Three manifest advantages which the system must possess are evident at once. In the reproduction of any finished drawing the labor of tracing is entirely done away with. The reproduction need not be of the same size as the original, but may be to any scale desired. The lines will be the same as those of the drawing, black upon white, instead of the unnatural and sometimes confusing white upon blue with which we are so compulsorily familiar. With the electric light, which is now in nearly every establishment big enough to maintain an organized drawing room, the copying is entirely independent of the sun, and may be done at any time most convenient. It would seem that photography thus applied has a great future of usefulness in engineering establishments, and that the blue print must inevitably be relegated to a more restricted sphere. The one objection which may suggest itself as to these photographic reproductions of drawings is that there is a limit to the size of them. This may be a beneficent feature rather than otherwise. It points the way to uniformity of size in shop drawings, and the size is a handy one. Working drawings as big as a barn door are one of the still surviving nuisances of the shop. Big drawings may still be made when necessary, and they may be reproduced in sections if they will not bear sufficient reduction, and the nuisance of rolling and unrolling and of climbing all over them when spread out will be avoided.—[American Machinist.

The Trade Outlook in South America.

Those competent to judge seem to think that the signs all point to an active year in South America on the part of the nations seeking to extend their trade. England will be in the field with a special commission, which, let us hope, will prove as satisfactory as the German customary policy of following up the pioneers and making profitable use of their experience. Unfortunately, South America is not yet in a good condition for a profitable trade. Mis-government has so undermined the resources of these States, rich though they may be in possibilities, that they have comparatively little capital to use in trade. There is enough, however, to furnish a rich reward to foreign enterprise, and the struggle to get it will certainly be a vigorous one. It may be that the risks are now excessive, but they will not always remain so.—[London Iron Trade Review.

THE WESTERN FOUNDRYMEN'S ASSOCIATION.

The regular monthly meeting of the Western Foundrymen's Association was held Wednesday evening, April 20, 1898, at the Great Northern Hotel, Chicago. The president, C. A. Sercomb, occupied the chair. The following were present: C. A. Sercomb, Schwab & Sercomb, Milwaukee, Wis.; A. D. Edwards, Illinois Iron & Bolt Co., Carpentersville, Ill.; A. W. Colwell, New York City; S. H. Whitaker, Dayton Coal & Iron Co., Cincinnati, O.; A. Sorge, Jr., O. T. Stantial, L. W. Lukens, Illinois Malleable Iron Co.; G. H. Carver, Plano Mfg. Co.; B. M. Gardner, *The Iron Trade Review*; Hanson McDowell; W. B. McElevey, Macfarland & Co.; A. M. Thompson, Link Belt Machinery Co.; H. S. Vrooman, E. W. Smith, Crane Co.; Theodore Kauffman, S. Obermayer Co.; P. D. Sloan, Garden City Sand Co.; C. E. Hoyt, J. M. Barnery, Lewis Institute, Chicago.

The following topical question was discussed: "Is it economical to ventilate a foundry artificially? What has been your experience?"

Mr. Carver: So far as our foundry is concerned, we are situated out on the prairies where there is plenty of ventilation without any artificial means. From experience I am unable to give you any points.

Mr. Thompson: It cannot be possible to ventilate a foundry economically by artificial means. It would be cheaper merely to open the windows and let the air in. There might be a question whether it would be necessary to ventilate a foundry artificially, but I cannot see that it can be done economically.

Mr. Smith: In the case of smoke in the foundry, it is desirable that it should be removed, but as to the economy of it, I have no means of giving any information. It seems to me that the shops can be ventilated by windows, transoms, etc. The shop where I am is provided with fans for removing the smoke. I was once in a foundry where the shop had been cut in the side of a hill and the roof was practically level with the top of the hill and they put domes over the shop for ventilation. We had eight extra domes over the roof, and in that case it paid.

Mr. Sorge: Is it not a matter of economy to ventilate the shop and remove the gases to enable the men to work?

Mr. Smith: I think that would apply to power ventilation. We often found it necessary in the shop referred to to employ fans also.

Mr. Sorge: It is some time since this question was first brought up, in connection with the discussion which was had here one evening referring to the division of labor. The question was whether it would not be a fair thing to ask of the foundrymen to ventilate the foundry artificially, to enable the molders to work while pouring was going on; whether it would not be economy, not only in the operation but because the output could be increased so largely as to decrease the cost of ventilating plant. I think if you attempted to ventilate a foundry by means of a chimney, you would find it very difficult to get sufficient volume of air to keep the foundry clear. The only effective way of doing it would be by some artificial means, as by a fan that would remove a large amount of air at one time.

The question was then taken up: "What is your experience as to the effect upon coke of exposing it freely outdoors?"

Mr. Stantial: I have all of my coke outdoors, but it does not stay in the pile long enough to deteriorate from exposure. I have never found that wet coke has given any poorer results than dry coke. The only thing I have found with coke that has been exposed a long time is that it sometimes softens.

Mr. Sorge: What effect does it have upon the sulphur in the coke?

Mr. Stantial: I have used coke that has been kept in a shed and coke that has been exposed to the air, and it never made any difference whether it was out in the air or in a shed.

Mr. Sorge: Would not sulphurous coke be improved by exposure?

Mr. Stantial: Not necessarily.

Mr. Vrooman: Is water a solvent of sulphur?

Mr. Sorge: Yes.

Mr. Carver: I used to think it was almost a necessity to have big coke sheds to keep the coke well housed, until by necessity we have been driven to keeping a supply out of doors. When I was in Detroit at the last session of the American Foundrymen's Association, I was surprised to see several hundred tons of coke at the Michigan Stove Co.'s works stored directly out in the open air. I asked Mr. Keep if he considered that it was good policy in every respect to keep it out of doors. He said yes. We keep our supply of coke out of doors and in watching it closely I see that sulphur in the coke is drawn to the surface, and if there is anything in water as a solvent of sulphur it will take a large percent of the sulphur contained in the coke.

Mr. Stantial: Have you had any analysis made to show this, or is it merely your opinion?

Mr. Carver: It is my opinion from the condition of the coke. You take a piece of coke as it comes to you and it looks perfect. After being stored a while out of doors you will find it spotted on the exterior and discolored from the sulphur being carried to the surface. It will look as if it was dangerous to use, but the fact is the sulphur has been drawn to the surface and possibly practically absorbed by the atmosphere. Furthermore, I think that if the coke can be treated to a good shower-bath the melting power would be improved and you would get better iron. I notice that, particularly on a wet day when we are compelled to use wet coke, we get better iron than when the coke is thoroughly dry.

Mr. Sercomb: You do not think that it softens under exposure?

Mr. Carver: I have seen no indications of it.

Mr. Sorge: You will find the same effect on pig iron that Mr. Carver describes as finding on the coke when it is exposed to the air. You will find the same surface discoloration.

Mr. Stantial: Have you known of any analyses being made of coke that will show this tendency?

Mr. Smith: I would like to ask Mr. Carver if it is not a theory that the spotted effect on the coke is caused by exposure? If a person had asked me, I would naturally have said that it would be detrimental to coke to leave it exposed, because I would have supposed that it would soften. As to the extra heat that Mr. Carver explains is due to the coke absorbing water, I think that could be explained in this way: The coke would not be consumed until it reached the proper point in the cupola and the combustion would not take place as quickly. It looks as though the moisture in the coke had assisted combustion. If it were possible to take the sulphur from the coke by exposure, there is no doubt but that the coke men would have done it.

Mr. Carver: I do not know what particular chemical action caused the discoloration, but I took occasion to take one sample that was badly discolored and send it to our coke men with a complaint about the coke and asked them for an honest analysis. They gave me the analysis. It was .95 per cent sulphur. They apologized and said that no such coke should have been sent us. When we received that coke, it showed no such indications of sulphur. You would not have thought that there was anything wrong with it at all. This piece had been exposed to the air for perhaps two months, and I selected it from the fact that it was so badly spotted and discolored, and the results proved that it was very high in sulphur.

The Secretary read the following letter:

SHARPSVILLE, PA., April 11, 1898.

Gentlemen:—I regret that my communication to your last meeting was not rightly understood. I merely claimed that it was not necessary to determine how much graphitic or combined carbon pig metal contained, and cited chilled and sand cast pig metal made from the same iron to illustrate the question. I do not deny that it is not often essential to know the total carbon contents of pig metal, but that is another question wholly foreign to what my communication presented. I had hoped to see my point discussed, as many seem to think it necessary to determine the relation between the graphitic and combined carbon in the pig metal in order to define its grade.

Yours truly,

THOS. D. WEST.

Nominations for officers, board of directors and editing committee to be voted upon at the May meeting were then made and the meeting adjourned.

ONE battery of the Semet Solvay coke ovens now building at Ensley City, Ala., will be completed in the next 60 days. All the products of the gases have been contracted for.

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The Cochrane Heaters and Purifiers and the Cochrane Live and Exhaust Steam Separators are noted in America and other countries for their practical, common sense design, substantial construction, reliability of action and general suitability for the purposes used. They have been approved and adopted by many very well-known consulting, advisory and acting engineers, and by hundreds of the big steam users. We take pleasure in answering inquiries, and to those interested, who will send particulars, we will also be pleased to forward printed matter, specifications, estimates, etc.

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INDUSTRIAL SUMMARY.

New Buyers in the Market, and Some of Their Wants :—

[If you are in need of machinery of any description, please notify *The Iron Trade Review*, and we will put you in communication with our advertisers at once.]

Frank H. Pavey, Connersville, Ind., is in the market for machine tools, iron and brass foundry equipment, steam plant and supplies.

For the Nolte Brass Co.'s new building to be erected at Springfield, O., bids will be received until May 1. The specifications include corrugated iron roofing, fire brick, gas engine, structural iron work, shafting, leather belting and steam freight elevator.

The Daellenbach Gas & Gasoline Engine Co., of New Castle, Pa., has been chartered with a capital of $35,000. It is composed of Pittsburg and Ellwood City capitalists. A plant for the manufacture of the engines will be located at Ellwood City.

The Aetna Machine Co., Westport, Conn., shears and general cultery, has been incorporated, capital $10,000.

The Southern Bolt Co., of Birmingham, Ala., has been incorporated, with capital of $30,000. The officers are John M. Caldwell, president; Charles O. Lock, secretary and treasurer; Samuel Randolph, superintendent. The contract for erection of the plant has been let and work will begin at once.

The Rhodes Pneumatic Valve Co., of Minneapolis, Minn., has been incorporated, with capital stock of $10,000, by J. G. Howard, H. N. Rhodes and E. C. Howard.

New Construction:—

To secure the rebuilding of the Pen Argyl (Pa.) Iron Works, burned down last year, the city has agreed to exempt the works from taxation for 15 years. It is believed rebuilding will soon begin.

The Berlin Iron Bridge Co., of East Berlin, Conn., has just completed at Grand ave., New Haven, Conn., a steel bridge 427 ft. in length, 52 ft. in width, with one roadway and two sidewalks. The approaches on the bridge consist of two deck plate-girders. The draw-span is 200 ft. in length and is operated by electricity; the same means being employed for lighting the bridge throughout. The bridge is of very heavy construction, the roadway being paved with vitrified brick adapted to the heavy city traffic.

The Boyas Machine Co., St. Louis, Mo., is building a three-story machine shop, 30x155 feet.

The new tin plate mill at Johnstown, Pa., is about completed and will start up in a short time.

The regents of Kansas State University, Lawrence, Kan., will rebuild and equip the machine shop and electrical engineering department burned down some time ago.

Additions, Enlargements, Removals, Etc.:—

Sanderson Bros.' Steel Co., Syracuse, N. Y., manufacturers of crucible steel, tool, spring, machinery and other steels, is making an addition to its plant for the manufacture of sheets.

The Shickle, Harrison & Howard Iron Co., of St. Louis, contemplates locating in East St. Louis, the site talked of being near the eastern limits of the city. The cost of the site will be $25,000, and property holders, assisted by the East Broadway Improvement Association. It is proposed to invest $100,000 in the new plant. The bridge arbitrary now paid on freight for eastward shipment and the lower taxes in East St. Louis are given as the reasons for the move.

At Hartford, Conn., an addition 25x40 feet is being built by the Vulcan Iron Works. New machinery will be put in.

The Lalance-Grosjean Co., of Harrisburg, Pa., will erect a warehouse, add a new annealing furnace and make other improvements.

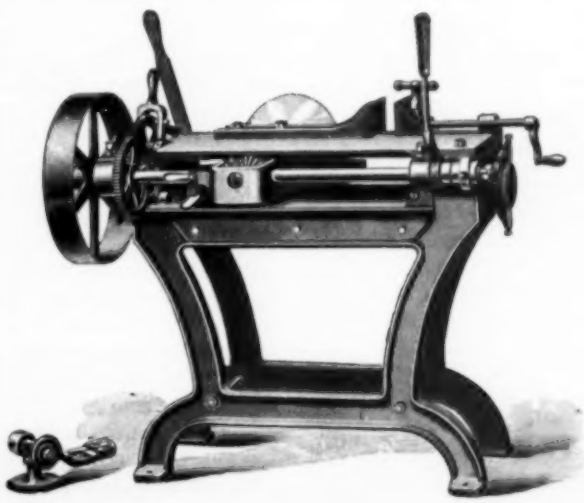
The National Sewing Machine Co., Belvidere, Ill., is building an addition to its foundry, 62x135 feet in size.

The Taft-Pierce Machine Co., Woonsocket, R. I., contemplates erecting an addition which will employ 40 more men.

The Diamond Match Co. is building an additional machine

The Q & C
Shop
Saws
Cut Everything. - - - -

No. 1. Capacity, 4 inches.
No. 2. " 5 "
No. 4. " 8 "
No. 8. " 3x12 "



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"OTIS" FIRE-BOX PLATES A SPECIALTY.

Flange Plates, Ship Plates, Tank Plates, Steel Car Axles and Forgings of all kinds.

Steel Castings from 100 to 75,000 lbs.

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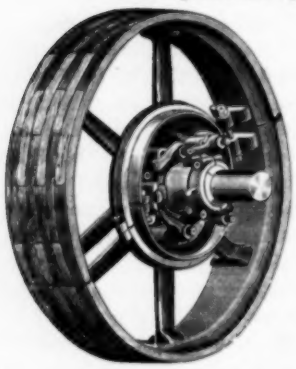

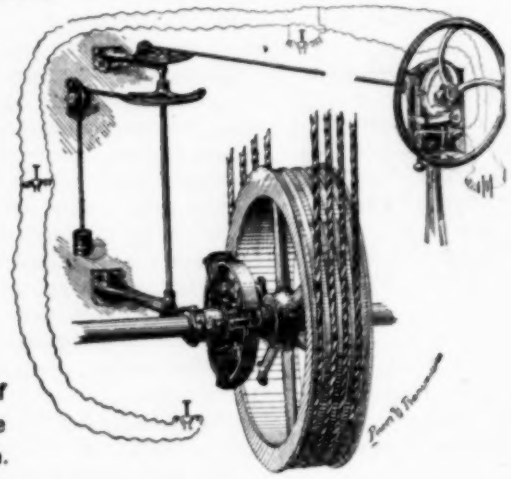

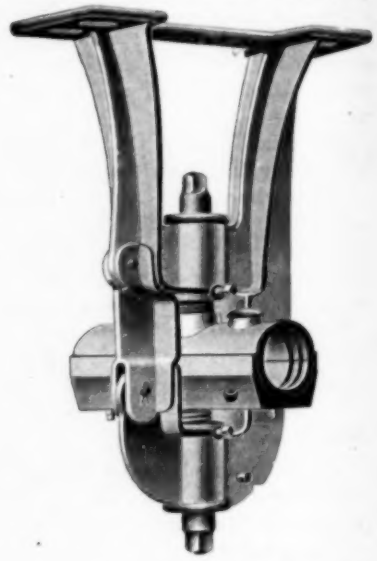

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Shafting, Hangers, Friction Clutches. Elevator, Brewery, Sugar Refinery and Oil Mill Machinery, Belting and Mill Supplies.

GENERAL AGENTS FOR THE DODGE INDEPENDENCE WOOD SPLIT PULLEYS.

shop, 50x200 feet at its Barberton, O., plant, and will remove to Barberton the New Haven, Conn., machine shop. The transfer will be made in the coming summer.

Fires and Accidents:—

The car wheel department of the Bass Foundry & Machine Works, at Ft. Wayne, Ind., was damaged $3,000 by fire, April 19.

The Estey Carriage Co.'s works at Owosso, Mich., burned April 19. Loss, $60,000; insurance $25,000.

Fire caused $20,000 damage to the foundry of the Chapman-Fulton Mfg. Co., Penn ave., Pittsburg. The machine shop was also badly damaged, as was the adjoining shop of Brush & Stevenson, pattern and model makers.

At Winsted, Conn., fire caused a loss of $25,000 to the Brown Machine Co.

The building of the Chapin-Fulton Co., manufacturers of bells, gas meters and regulators, Pittsburg, was destroyed by fire, April 21. The loss on materials and patterns is estimated at $10,000. The pattern works of Brush & Stephens, occupying the same building, was damaged $3,000.

The factory of the Brown Machine Co., Winsted, Conn., was destroyed by fire on April 15, causing a loss estimated at $25,000, covered by insurance.

The Southern Pacific Railway Co.'s pattern warehouse, Sacramento, Cal., was destroyed by fire on April 9. The warehouse contained patterns of all castings made in the railroad shops since their location. There were thousands of these, from a pattern for a small case nut to the most intricate casting on a modern engine. From the nature of the contents of the building, it is almost impossible to estimate the loss sustained by the fire. The loss is very heavy.

The Bellefonte Car Works Bellefonte, Pa., caught fire from the cupola, April 21, and two buildings in which patterns were stored were burned. Loss, $10,000.

U. BAIRD MACHINERY CO.,

123-125 Water St., **PITTSBURG, PA.,** 124-126 First Ave.

Machine Tools and Supplies. Send for list of Second-hand Tools.

McDOWELL

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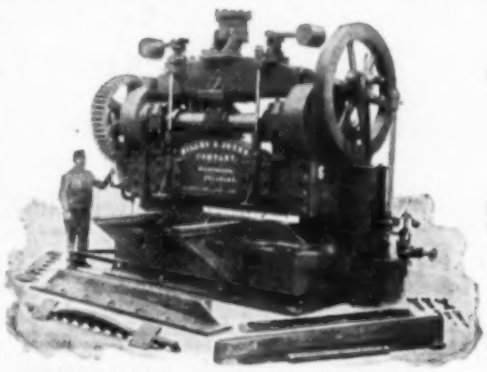

Improved Multiple Punch and Gate Shear.

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PLATE STRAIGHTENING ROLLS especially designed for ROLLING MILL SERVICE.

Larger and smaller sizes for any capacity. Engine, Motor and Pulley driven.

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GENERAL DRAUGHTING AND DESIGNING.

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CLEVELAND, O.

General Industrial Notes:—

There is no move toward resuming at the puddle mill of the Wheeling Steel & Iron Co. The men have refused to puddle 2,500 pounds for the present scale rate for a ton.

The furnace of the Hamilton Iron & Steel Co., Ltd., of Hamilton, Ont., is producing iron from a mixture of native and Lake Superior ores. The company is obtaining both magnetite and hematite Bessemer from mines in Hastings and Renfrew counties. It is also receiving sample lots of hematite from the north shore of Lake Huron, where a mine is being opened by the Hamilton Iron Mining Co. The latter company has contracted to deliver 25,000 tons of ore to the furnace.

The Midvale Foundry, South Allentown, Pa., is working over-time on a Government contract for 300 cast iron torpedo casings.

The Heilman Machine Co., Evansville, Ind., has made an assignment, due, it is said to a disagreement among stockholders as to policy. The company was incorporated in 1884 with capital of $200,000. The liabilities are $90,000. The assets are estimated at $90,000 in real estate and $120,000 in machinery and accounts.

A proposition is under consideration for the erection of a Uehling casting and conveying plant for the common use of several Sharpsville, Pa., furnaces. Such an arrangement would save in installation expense but the users would still pay the royalty charge in each case. It is not fully determined that such co-operative use of this apparatus would be feasible.

The Illinois Car & Equipment Co., at Anniston, Ala., is at work on orders for 600 cars.

The Wheeler-Sterling projectile works at McKeesport, Pa., are running day and night. Since March 10, over 2,000 shells have been completed. The weekly product is 100,000 pounds.

The new La Belle Iron Works plate mill at Wheeling is about completed. It is in all respects modern.

The Rice Machinery Co., 166-174 South Clinton st., Chicago, reports its business to be very good and of a larger volume than at any time during the last three years. It lately secured the contract for two complete plants for the Glucose Sugar Refining Co., to be erected at Davenport and Marshalltown, Iowa.

The Wier Plow Co., Monmouth, Ill., has assigned. The burning of most of the plant two years ago caused a crippling loss.

The Oliver Iron & Steel Co., Pittsburg, is busy on a rush order for a large quantity of bolts and rivets, to be used in Navy Yard work.

Stockholders of the Jefferson Iron Works, Steubenville, O., now in the hands of a receiver, met April 21, and decided to issue as preferred stock $61,700 in shares of $100 each, which will be additional capital to be used in paying off indebtedness and putting the plant in operation. The receivership will be lifted as soon as the new stock is subscribed.

At Ellwood City, Pa., employes of the Ellwood Weldless Tube Co. struck for a 10 per cent. The Shelby Steel Tube Co., at Greenville, recently made a voluntary increase of 10 per cent.

Pawling & Harnischfeger, of Milwaukee, Wis., have opened an office in the Fidelity Bldg., Pittsburg, with W. C. Beach, manager, representing them in the crane line.

The Minnesota Iron & Steel Co., Minneapolis, Minn., is now running its bar mill double turn, the increased product being necessary to keep up with its orders.

J. A. Yates & Co., Birmingham, Ala., has just furnished the Sloss Iron & Steel Co. with a complete hydraulic mining plant for the development of its brown ore deposit at Leeds, Ala. They also have supplied pressure and other pumps to the Syndicate Powder Co., a new enterprise in Birmingham.

The Strange Forged Drill & Tool Co., New Bedford, Mass., is working on several very large foreign orders for its drills, ranging in size from small wire drills to two inches.

INLAND IRON & FORGE CO.,

Marquette Building, CHICAGO, Manufacturers of

BAR IRON AND STEEL,

Angles, Channels and Special Shapes for Car, Carriage and Wagon Work.

Iron and Steel Car Axles and Forgings.

Works, EAST CHICAGO, IND.

(Formerly owned by East Chicago Iron & Steel Co.)

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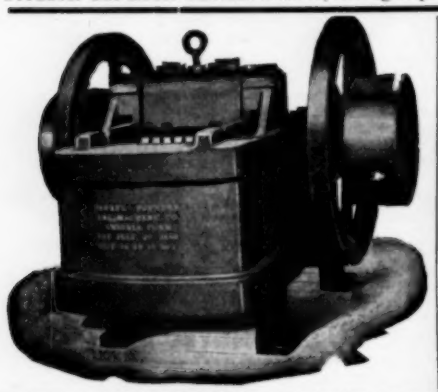
Regenerative Gas Furnaces and Water Seal Gas Producers.

Producer Gas under Tubular Boilers, saving 20 per cent in fuel. NO SMOKE.



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EARLE C. BACON, Engineer,

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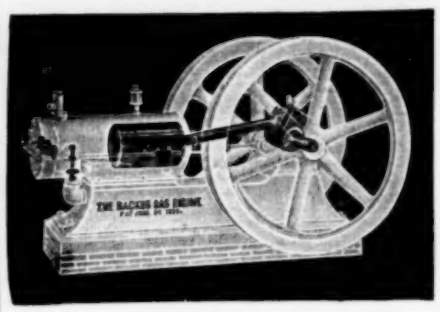
Backus Gas and Gasoline Engines.



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HOME OFFICE:

BACKUS WATER MOTOR CO.,

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The Brown GAS AND GASOLINE Engine.

Uses Gas or Gasoline. Makes no compression while engine is running idle. Charges fired with electric spark tube igniter. Made upon honor and fully guaranteed. Write for description and prices.

Columbus Machine Co.,

COLUMBUS, O.

The Western Valve Co., of Chicago, has certified to an increase of capital stock from $10,000 to $40,000.

The Homestead Valve Mfg. Co., Homestead, Pa., has been incorporated with a capital stock of $50,000, by F. Schuchman, E. E. Andrews, Wm. Heston, Jno. Munhall and Wm. Tunstall. The new concern will succeed the present firm, known as Homestead Mfg. Co., Ltd., manufacturers of valves.

The Mansfield (O.) Machine Works have disposed of their steel tube department to the Shelby Steel Tube Co.

Negotiations are on foot for the erection of a charcoal iron furnace at Deseronto, Ont. The Rathbun Co., of that place formerly exported charcoal to the United States, but the Dingley tariff put an end to the trade and the company is seeking to use its product at home. A bonus in aid of the industry has just been voted by the town. Well known charcoal iron producers of Detroit are connected with the enterprise.

Pawling & Harnischfeger, of Milwaukee, Wis., have opened an office in the Fidelity Bldg., Pittsburg, with W. C. Beach, manager, representing them in the crane line.

The sale of the Poultney Foundry & Machine shops, at Youngstown, which were purchased two weeks ago at public auction, by Frank P. Hood, has been confirmed.

The Cambria Iron Co. has sold the Gaysport Furnace, at Hollidaysburg, and the movable property to C. McLanahan, of that place, who resold to Thomas K. Maher, of Altoona. The machinery will be dismantled and the old furnace torn down. This is the last of the 14 iron furnaces of Blair county.

The Leechburg Foundry & Machine Co., of Pittsburg, has shipped to the La Belle Iron Wroks, Wheeling, W. Va., a three-high bar mill for rolling sheet and skelp up to 16 inches wide.

The Rice Machinery Co., 166-174 South Clinton st., Chicago, has furnished all the power transmission machinery for the Cudahy Packing Co.'s plant at Omaha.

The National Tube Works Co., of McKeesport, has received an order from the Government for 17,000 steel and charcoal iron tubes for use on battleships and cruisers. The order is part of a contract for 45,000 tubes which the Government has given for the duplication of the boiler tubes of all its fighting ships. The whole order will amount to about $100,000, the share of the National Tube Works Company being about 40 per cent. The Shelby Steel Tube Co., of Shelby, O., will make 17,000 seamless tubes, and the remainder of the order was divided between the Reading Iron Works Co., of Reading, Pa., and the Syracuse Tube Works, of Syracuse, N. Y. The tubes being made in Pittsburg will be used to duplicate those now in use on the Indiana, Iowa, Massachusetts, part of the Texas, Amphitrite and Puritan. They will be from 8 to 10 feet long.

The Todd Pulley Works, of East St. Louis, assigned last week. The liabilities are said to be about $100,000, assets not given. The plant employed about 100 hands. The assignment includes the Todd-Stanley Mill Furnishing Co., of St. Louis. Both plants were under the same management.

The Illinois Central has asked for bids for 500 freight cars.

$1.50 to Columbus and Return.

Sunday, May 1st, via C., A. & C. Ry., Mt. Vernon-Pan Handle Route. Special train leaves Cleveland Union Depot, 7:00 A. M.; returning leaves Columbus Union Depot 6:30 P. M. Carries elegant parlor car and special baggage car for wheels (checked free). Miles of beautiful streets and avenues in Colnmbus. A paradise for wheelmen. Ask agents for particulars, or write to C. F. DALY, Gen. Pass. Agt., Cleveland, O.